PIT AND QUARRY

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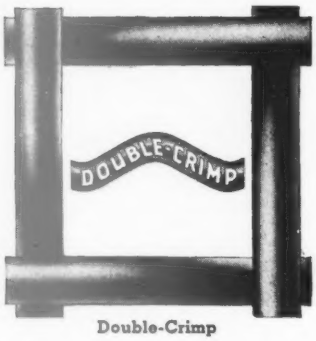
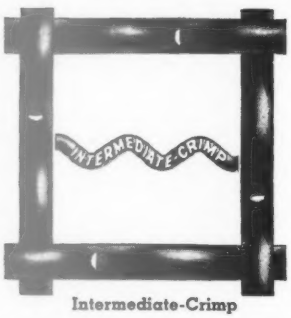
OCTOBER, 1943

FOR 26 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

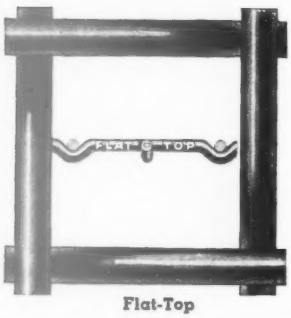


Double-Crimp

Arch-Crimp



Intermediate-Crimp



Flat-Top

"The Perfect"

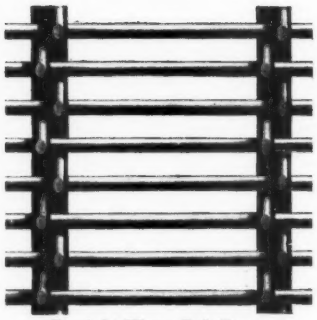
Wire Cloths and Screens

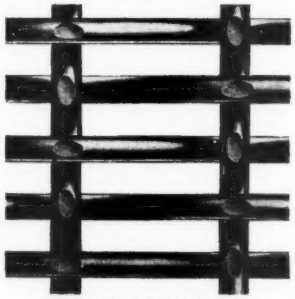
of

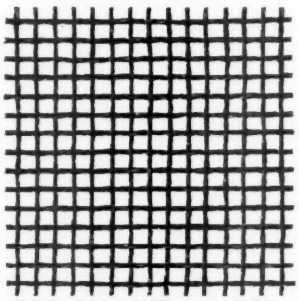
SUPER-LOY
STEEL
GALVANIZED STEEL
STAINLESS STEEL
NICKEL-CHROME STEEL
PHOSPHOR BRONZE
BRASS
COPPER
MONEL
NICKEL
ALUMINUM

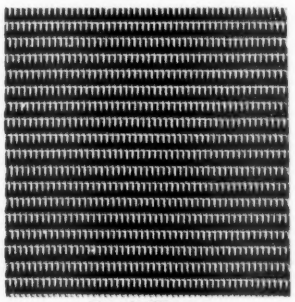
•

Any Special Metal for Any Service


Straight-Warp Rek-Tang


Calendered Rek-Tang


Triple Twisted Warp and Fill


Dutch Weave

"Perfect" WEAVES

Arch-Crimp
Coiled
Double-Crimp
Double-Fill
Dutch
Flat-Top
Herringbone
Intermediate-Crimp
Rek-Tang
Selvage-Edge
Straight-Warp
Stranded
Sta-Tru
Triple-Warp
Twilled
Twisted-Fill
Twisted-Warp

"Perfect" PROCESSING

Arc-Welding
Bending
Binding
Brazing
Calendering
Coiling
Crimping
Cutting
Dipping
Dishing
Finishing
Flanging
Flattening
Forming
Framing
Galvanizing
Jointing
Knuckling
Painting
Rolling
Selvaging
Shaping
Shearing
Slitting
Soldering
Spot-Welding
Squaring
Stitching
Tack Welding
Trimming

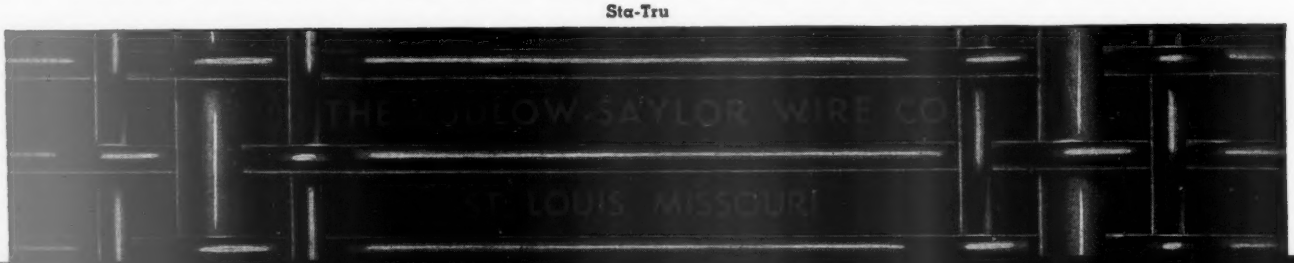
"Perfect" PRODUCTS

Baskets
Circles
Coils
Cones
Cylinders
Discs
Forms
Leaves
Lengths
Panels
Pieces
Ribbons
Rings
Rolls
Sections
Segments
Strips
Templates

Illustrations show items listed in bold-face type.

Other wire cloths and screens will be illustrated in subsequent advertisements of this series.

Sta-Tru



HOW TO MAKE CHAINS AND SPROCKETS RUN BETTER.....LAST LONGER

1 Keep shafts exactly parallel, and wheels exactly in line. Misalignment causes uneven loading and unnecessary wear.

2 Remove chain frequently and clean thoroughly in some solution to wash out harmful dirt and grit. Then immerse in oil.

3 Protect chain and wheels from needless exposure to abrasive materials, dust and dampness. Use oil-tight casings with high-speed silent or roller chain drives.

4 Inspect shaft bearings by removing grease from bearing ends to expose the actual bearing metal. Rebabbitt if needed.

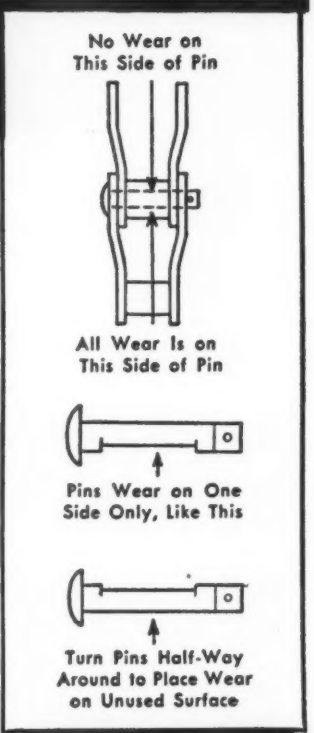
5 Flush ball or roller bearings periodically with fresh grease to drive out foreign matter and replenish the seals. In dusty atmosphere or dirty locations, use auxiliary dust seals.

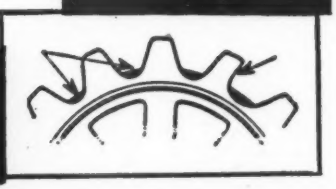
6 Check machinery supports for vibration and reinforce if necessary.

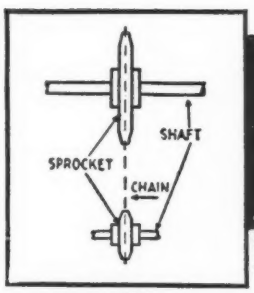
7 Operate chain with a little more slack than normal for a flat belt. Tight drives wear chain and sprockets needlessly.

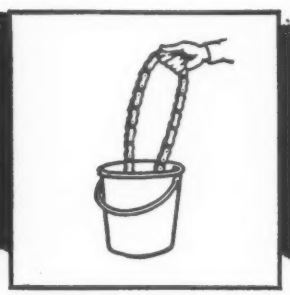
8 WHAT TO DO FOR WORN CHAIN

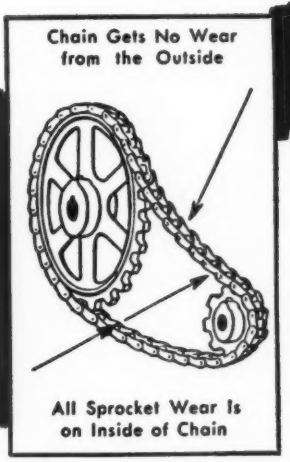
Turning a chain over so that the opposite side contacts the sprockets is a quick and easy means of restoring the original backing dimensions on cast pintle chains. On roller chains of either cast or steel fabricated types, this same simple operation will bring practically new surfaces into play under the rollers. In designs where pins are locked against rotation, wear is confined to that side against which the next link is held under tension. Rotating these pins 180°, places articulation action upon a practically unused pin area and, as far as the pins are concerned, restores original pitch. Bushed type chains afford another opportunity for pitch correction by reversing the bushings or rotating them 180°, but this involves the dismantling and reassembly of heavy press fits and should be avoided except as a last resort.


No Wear on This Side of Pin
All Wear Is on This Side of Pin
Pins Wear on One Side Only, Like This
Turn Pins Half-Way Around to Place Wear on Unused Surface









9 WHAT TO DO FOR WORN SPROCKETS

Cast-tooth sprockets, particularly in the larger diameters, frequently can be reversed on the shaft to bring chain barrels, or rollers, into contact with unworn root-diameter surfaces, but worn root-diameters on all types may be built up by welding and grinding smooth to fit the chain. Should wear have deformed the teeth of cast-tooth wheels into a hook-shape, these hooks may be ground off, or the wheels reversed.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Toronto 8.
Offices, warehouses and distributors in principal cities.

9278

LINK-BELT

THE SYMBOL OF QUALITY · LINK-BELT COMPANY · LB

CHAINS AND SPROCKETS

For Conveying and Mechanical Power Transmission

PIT AND QUARRY October, 1943. Vol. 36. No. 4. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $2 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

THE BIG THREE
of Rollway's Right-Angle Bearing Loading

1. GREATER BEARING CAPACITY

2. LOWER STARTING TORQUE

3. REDUCED MAINTENANCE TIME

Whether it's heavy radial loads or thrust loads . . . constant loads or shock loads . . . that are bothering you, change-over to Rollway Precision-Type Cylindrical Roller Bearings offers a quick, easy way to achieve: 1—more bearing capacity; 2—lower starting torque; 3—improved service from a maintenance standpoint. ALL within the dimensional limits of your present sleeve-type bearings.

Right-Angle Loading Simplifies the Stresses

Simplification — that's the answer back of the increased capacity and life of Rollway's Cylindrical Roller Bearings. For Rollway splits every load into its two simple components of *pure radial* and *pure thrust—carrying each of these on separate bearing assemblies at right angles to the roller axis*. That eliminates compound loads, oblique loads, and the resultants of compound forces. The total magnitude of stress carried per roller and per bearing is substantially less. Rollers and races stand up longer. Lubrication is simplified. And the cylindrical rollers eliminate all tendency to pinch out between the races, greatly reducing end-rub and wear-back of the roller head.

For longer bearing life, more efficient performance and more economical maintenance . . .

FOLLOW THIS BASIC BEARING PRINCIPLE

- All radial loads carried at right angles to the roller axis.
- All thrust loads carried at right angles to the roller axis.

Standard Sizes for Most Applications

S.A.E. or American Standard metric dimensions and tolerances in a wide range of sizes and types assure low cost and ready availability for most applications. Let Rollway engineers recommend the types best suited for your needs. Just send drawing or detailed description. No cost or obligation for this helpful service.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, N. Y.

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

One Hundred and Ten Years Young!

As Cooper-Bessemer passes this important milestone in its second hundred years, our energies are focussed on two all-important objectives:

1. Now we are concentrating 100% on war production—building diesel and gas engines, compressors, and foundry products, to help win the war as soon as possible.
2. We are preparing, after Victory, to manufacture improved power equipment of several types—to meet a peacetime demand for efficient, low-cost horsepower which promises to be the biggest we have seen in our 110-year history.

This is the fifth American war in which Cooper-Bessemer has had a share in the winning. For the fifth time, also, an all-out war experience has made us young. It will assist us to serve America all the better, for post-war reconstruction and peacetime prosperity.

THE Cooper-Bessemer CORPORATION

Mt. Vernon, Ohio • Grove City, Pa.

BUILDERS OF DEPENDABLE ENGINES FOR 110 YEARS

Available

TO SAVE TIME-MANPOWER-MONEY

THE *St. Regis* VALVE PACK SYSTEM

1 **SAVE TIME.** Preweighing and forcing cement at high speed through the valve opening, the St. Regis Valve Bag Packing Machine under average operating conditions packs from 8 to 24 (94 lb.) Multiwall Bags per minute. Experience proves that this machine saves from 30% to 50% in actual manhours.

2 **SAVE MANPOWER.** *Only one* operator is required on the St. Regis Valve Bag Packing Machine even when it is equipped with 2 or 4 filling tubes. So simple is the work involved that it can be quickly learned and skillfully performed by inexperienced hands. Since all lifting of bags is eliminated, the machine can be successfully operated by a woman where the manpower shortage is acute.

3 **SAVE MONEY.** Installed and operated at minimum expense and eliminating the need for any closing equipment, the St. Regis Valve Bag Packer assures lasting economy. Its outstanding service record in leading rock products companies shows 10, 15, 20 and 25 years of unbroken use.

4 The number of these machines available for immediate installation is limited. Should you be interested in a St. Regis Valve Bag Packing Machine, it would be wise to lose no time in communicating with our nearest office.

MULTIPLY PROTECTION • MULTIPLY SALEABILITY

ST. REGIS PAPER COMPANY

TAGGART CORPORATION • THE VALVE BAG COMPANY

NEW YORK: 230 Park Avenue

CHICAGO: 230 No. Michigan Avenue

BATES VALVE BAG CO., LTD.
Montreal, Quebec
Vancouver, B. C.

Baltimore, Md. Birmingham, Ala. Dallas, Tex. Denver, Colo.
Los Angeles, Calif. New Orleans, La. Seattle, Wash.
Franklin, Va. Nazareth, Pa. San Francisco, Calif. Toledo, Ohio

GIVE 'EM THE ONCE OVER EVERY DAY

● Built to haul heavy excavation in off-the-highway service, Rear-Dump and Bottom-Dump EUCLIDS are moving countless tons of earth, ore and rock on jobs that are vitally important to our war program. Like other material moving equipment, new EUCLIDS are obtainable only for high priority jobs so units now in service must be kept rolling.

Because it may be difficult to obtain replacement parts promptly, regular servicing and inspection is more important than ever if capacity production of your equipment is to be maintained. This daily check list may help to reduce idle equipment time:

1. Check crank case oil, radiator fluid, tire pressures, air reservoir and battery.
2. Service air cleaner and oil filler breather.
3. Check oil filter cartridge, and replace if dirty.
4. Tighten all bolts, nuts and connections.
5. Lubricate according to Euclid instruction manual.

This is only a partial list of the points that should be checked and serviced regularly — refer to your Euclid Instruction Manual for detailed instructions or write our Service Department if you have a special problem.

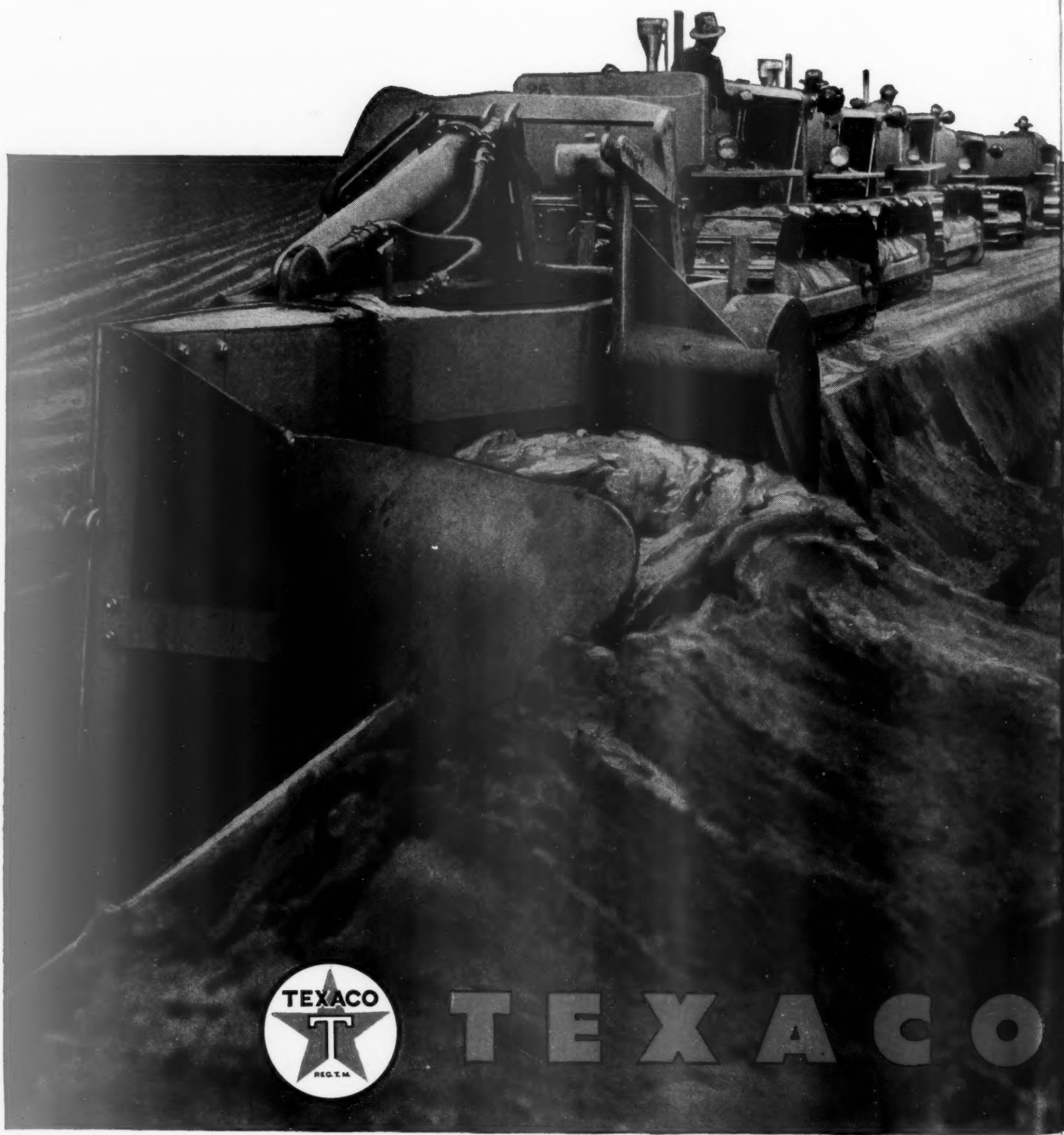
The EUCLID ROAD MACHINERY Co.
CLEVELAND, OHIO

EUCLID

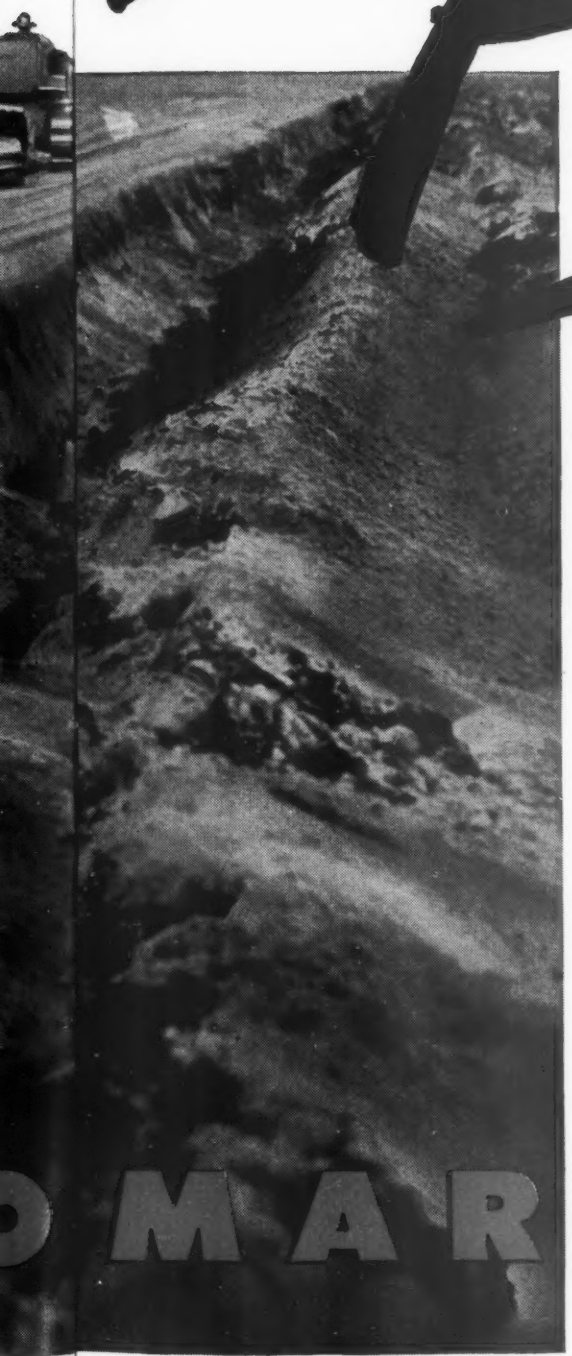
SELF-POWERED HAULING EQUIPMENT
For EARTH . . ROCK . . COAL . . ORE
CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

EUCLID THE PIONEER

WORLD'S



LARGEST *Plow*



THE MAN behind *this* plow is the camera man, photographing the bringing to the surface of fertile top soil buried in deep sand by a rampaging river.

To protect the bearings of tractors and other earth-moving equipment, prominent contractors everywhere are lubricating them with *Texaco Marfak.*

Texaco Marfak protects against wear by providing ideal lubrication with a tough, adhesive film that protects chassis parts against road splash, sealing out sand and grit, sealing itself in the bearing.

In wheel bearings, *Texaco Marfak Heavy Duty* stays in the bearings — off the brakes — winter and summer.

We believe that it will pay you to call in a Texaco Lubrication Engineer, available through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ *More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.*

★ *More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.*

★ *More revenue airline miles in the U. S. are flown with Texaco than with any other brand.*

★ *More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.*

★ *More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.*

MARFAK

TUNE IN THE TEXACO STAR THEATER
EVERY SUNDAY NIGHT—CBS

★

HELP WIN THE WAR BY
RETURNING EMPTY DRUMS PROMPTLY

No man can work faster than his machine permits. This is especially true of tractor operators. To increase the tempo of stripping operations, road-building, cleaning-up, hauling, and other tractor jobs . . . give your operator a unit that "eats up" the work. Give him a 2-Cycle Diesel — the modern Diesel! There's no lost time going to work . . . no delay starting up after lunch periods. Starts like your car — INSTANTLY! Packs a real wallop, too, that carries it quickly through the toughest going — gets in there and lugs where ordinary units stall. Hangs on to overloads with steam-like tenacity — which means less gear-shifting! Maneuvers more rapidly . . . applies its power smoothly, without laboring. Keeps going 24 hours a day, if necessary, with a minimum of attention.

Fifteen per cent of our crawler tractor production is released for essential civilian requirements. See your Allis-Chalmers dealer about the availability of equipment for your needs.

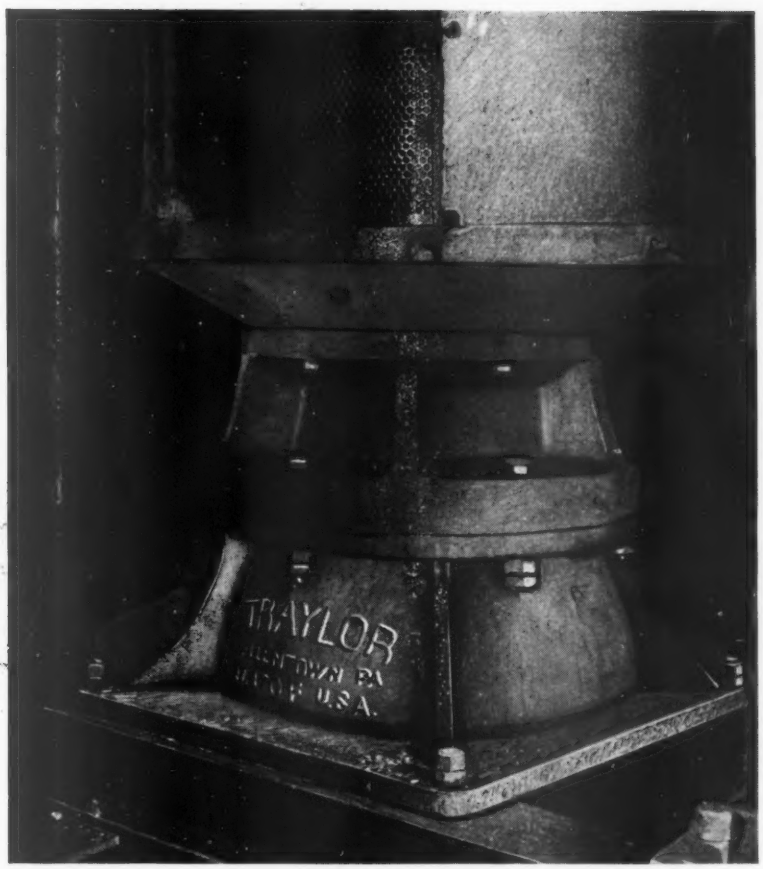
2-cycle
THE MODERN DIESEL POWER

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE · U. S. A.

TRAYLOR

Type TY

REDUCTION CRUSHER



WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

When a crusher sells by hundreds annually,—when it is used in thirty-one states of the Union, in five Canadian Provinces and thirteen foreign countries on five continents,—when it is crushing to owners' satisfaction marble, limestone, granite, trap rock, slag and practically every variety of ore, including the hardest,—and when users habitually reorder,—then, surely, it can fairly lay claim to have "arrived."

That is the shortest way we can think of to tell you of the success of the Traylor Type TY Reduction Crusher, a machine that is unsurpassed for medium fine crushing.

The reasons? There are eight of them, —features of this great crusher,—that add up to these advantages: (1) it delivers exactly the kind of product required, of the right size, in satisfying capacity; (2) it has strength enough, and to spare, to stand up under its job (built of steel throughout); (3) it extracts the last ounce of wearing metal (the patented Bell Head and Curved Concaves take care of this by eliminating choking), it is otherwise inexpensive to maintain (automatic force-feed lubrication), and it is economical in the use of power (cut gearing and roller bearings); (4) it is fool proof (assured by protective devices against dust and tramp metal).

What the TY is doing for others,—increasing their profits,—it can do for you! Let us tell you all the story in detail. Write us,—now, before you forget!

SEE BULLETIN 3112

TRAYLOR

ENGINEERING & MANUFACTURING CO.

MAIN OFFICE AND WORKS — ALLENTOWN, PENNA., U.S.A.

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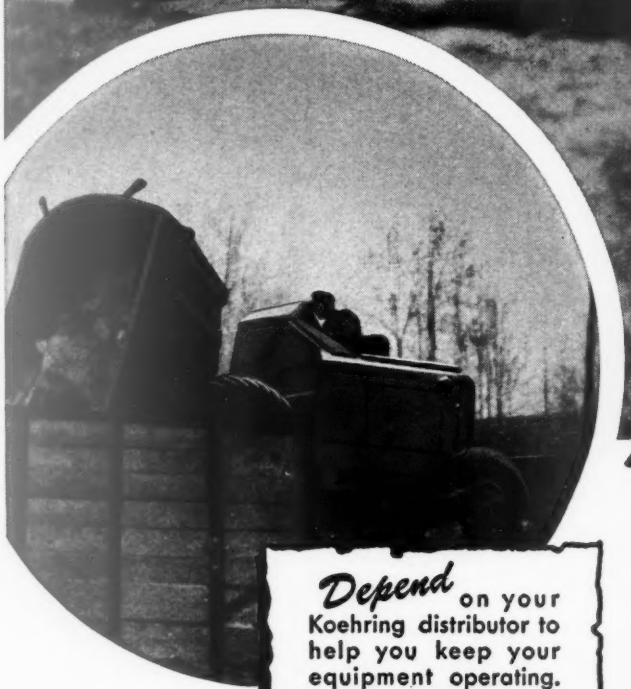
B. C. EQUIPMENT CO., LTD.
551 Howe St., Vancouver, B. C.

Export Department — 104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro, Montevideo.

Save Seconds Every Trip



DUMPTORS PROVIDE SPEED VITAL TO WAR CONSTRUCTION

The operator merely trips the lever, and he's ready for another trip . . . that's how seconds are saved on every load. The Koehring Dumptor has no complicated mechanical body hoist arrangement . . . no delays . . . no hoist repair worries. The load is dumped exactly where you want it . . . when you want it . . . because it's simple and instantaneous. Traveling forward or reverse with three speeds either way helps keep lost time at a minimum.

KOEHRING COMPANY
Milwaukee, Wis.

Depend on your Koehring distributor to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

READY! Simplified Catalog of G-E Renewal Parts

HELPS GET PARTS FASTER

- ✓ Quickly identifies needed parts—pictorially!
- ✓ Simplifies ordering by catalog number
- ✓ Speeds delivery from G-E warehouses or factories
- ✓ Gives dimensions, descriptions, prices on all parts required most frequently
- ✓ Includes parts for G-E motors, control, switchgear and other widely used electric equipment; also supplies, such as magnet wire, insulating materials
- ✓ Makes it easier to order *genuine* G-E parts, for better fit and long-lasting performance

NOW, a single book—indexed for easy reference—can take the place of separate handbooks and bulletins for identifying and ordering most G-E renewal parts needed to keep your equipment in operation. With this book, you'll find it easier to order genuine G-E parts *by catalog number*—saving time all along the line.

For your copy, just mail the coupon. Even though you don't need it now, it may save precious hours in an emergency. *General Electric Company, Schenectady, N. Y.*

GENERAL ELECTRIC

General Electric Co., Section AA 750-220
Schenectady, N. Y.

Yes, I want a copy of your new 96-page catalog "Renewal Parts and Supplies (GEA-638)" to help simplify ordering of genuine G-E parts.

Name.....

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"It's here to do a job, Pal—and soon!"

"We can't get along without plenty of that *friendly* wire rope. What does it do? Just stick around, soldier—and how do you think that souped-up bronco you're running around in got off the boat? Wire Rope!"

The guard is right. It takes a lot of easy-handling wire rope to move the stuff an Army needs. Think of North Africa—think of Sicily! And there has to be *enough* of it!

That's why you and we at home here have to conserve the wire rope *we* use.

But when you do need to order replacements, won't you please accept it *without* reels, if lengths permit, so that handier reels can be spared for the boys out there? Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, N. Y.

• • •

Wickwire Spencer, the first in New England to be awarded the Maritime M and Victory Fleet Flag, has now received the GOLD STAR for maintaining excellence of production.

DO YOUR MEN KNOW PROPER SHEAVE DIAMETERS?

Our FREE book, "Know Your Ropes," will tell them. It tells why a sheave that is too small wears out rope fast. It shows how to figure the right size sheave for every diameter of rope . . . and gives numerous other "Life Savers" that will help make your present wire rope last longer. Send for your free copy, today!

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCTS

"Gulf Quality Lubricants and Fuels are helping us complete this important Flight Strip on Schedule" *says Job Superintendent*

"Our equipment is run continuously 24 hours a day. We can't permit needless breakdowns . . . that's why we stick to quality petroleum products."

MacDougald Construction Company, Atlanta, Georgia, is working three 8-hour shifts, 7 days a week to complete the airport flight strip pictured above. Keeping "on schedule" involves the grading of upwards of 30,000 yards of earth each day. There is no time for equipment breakdowns or unnecessary delays. That's why job Superintendent Frank Nichols plays safe by using Gulf Quality Petroleum Products.

On job after job throughout the country Gulf Products are playing an enormously important part in keeping contracting equipment rolling under the most punishing conditions. They provide maximum protection to moving parts and insure peak operating efficiency.

You, too, can enjoy the proven benefits provided by Gulf higher quality lubricants and fuels. No matter where your job is located, you are sure of quick delivery through more than 1200 warehouses located in 30 states from Maine to New Mexico. Write or phone your nearest Gulf office today.

GULF

GULF OIL CORPORATION
GULF REFINING COMPANY
GULF BUILDING, PITTSBURGH, PA.

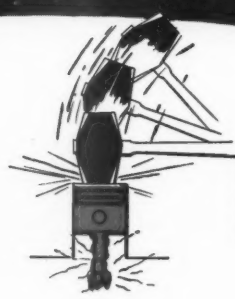
Get in the Scrap...

don't make it!

BUDA

... start regular engine maintenance NOW!

SURE you can buy Buda engine parts—they're stocked by BUDA distributors all over the country. But those stocks are precious reserves to keep America's Victory power on the job. Every part used must be replaced—using up needed materials, precious skilled machinist's time, scarce machine-tool capacity. Every part that regular engine care can save helps us build MORE for the actual battlefront. So dig out your instruction book and TAKE CARE OF THAT ENGINE—REGULARLY!



ORDINARY DIESELS . . . High cylinder pressures produce sledge-hammer blows that punish pistons, rods and crankshaft every power stroke.

•

BUDA Low-Pressure DIESELS
Prolonged "low-pressure" combustion delivers a smooth, steady power stroke that cuts vibration, saves parts.

•

the BUDA Co.

Harvey (Chicago Suburb) Illinois

Which of these GATES V-Belts Best Fits YOUR Needs?

– Steel Cable Belts?
– Rayon Cord Belts?
– Cotton Cord Belts?
– Static Reducing Belts?
– Belts of Special Synthetic Rubber?

Phone Your Gates Field Engineer – He Will TELL You!

Whenever a drive in your plant gives you even the slightest trouble, it is a good plan to phone the Gates Field Engineer. He is a specialist who *makes a business* of improving drive operation.

For example, it quite frequently happens that one or more drives in a plant will wear out belts faster than seems warranted. In most cases a slight correction in groove angle, an adjustment in tension or, at most, a minor change in drive design will correct the difficulty and save money not only in belt wear but also in increased efficiency of the machine.

At times, however, the service conditions are such that a V-belt of special construction can most profitably be used. Your Gates Field Engineer will *know*—and he can supply a Gates V-belt that is precisely engineered to meet the unusual conditions.

The Gates V-belt of special synthetic rubber is a case in point. During the past five years, Gates has supplied industry with thousands upon thousands of these belts. Under severe conditions of heat and oil, the Gates special synthetic belt actually outwears any natural rubber belt by as much as 230%.

In your particular application, V-belts whose tension members are composed of flexible steel cables—or of rayon cords—may prove to be the most efficient and economical. Static-reducing V-belts may best fit your special need.

In any case, the wisest move you can make is to phone the Gates Field Engineer. He is thoroughly competent to analyze any drive problem. He is completely informed on on the nature and advantages of every type of belt. He will always recommend the practice that will be most efficient and economical for you.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

4310

GATES VULCO ROPE DRIVES

CHICAGO, ILL. 549 West Washington
NEW YORK CITY 215-219 Fourth Avenue
ATLANTA, GA. 738 C & S National Bank Building
LOS ANGELES, CAL. 2240 East Washington Boulevard
DENVER, COLO. 999 South Broadway
DALLAS, TEXAS 2213 Griffin Street
PORTLAND, ORE. 333 N. W. 5th Avenue
SAN FRANCISCO, CAL. 1090 Bryant Street

ON GUARD against FRICTION

Today's stepped-up production schedules calling for ever-increasing loads and speeds of machinery in all lines of industry have definitely established the fact that PROPER LUBRICATION IS THE NO. 1 ESSENTIAL. There is NO industrial item of greater importance.

LUBRIPLATE, "The Modern Lubricant," will help you keep FRICTION out of your plant. This is no time to be losing the precious production time of your machines, by fooling around with hot or scored bearings, worn gears, chains and other machine parts, also remember this . . . replacements are most difficult to obtain these days.

LUBRIPLATE is truly the lubricant to cope with today's requirements . . . it possesses characteristics not to be found in other lubricants. LUBRIPLATE maintains a wear-resisting, load-bearing film on contacting moving machine parts. LUBRIPLATE definitely *arrests progressive wear.* It protects machine parts against rust and corrosion. It saves power.

LUBRIPLATE is extremely economical because a little goes a long way . . . it stays put and lasts and lasts.

Regardless of the nature of your business, if you use machinery you need LUBRIPLATE. Let us know your industry so that we can mail you "THE LUBRIPLATE FILM" and other valuable data . . . no obligation.

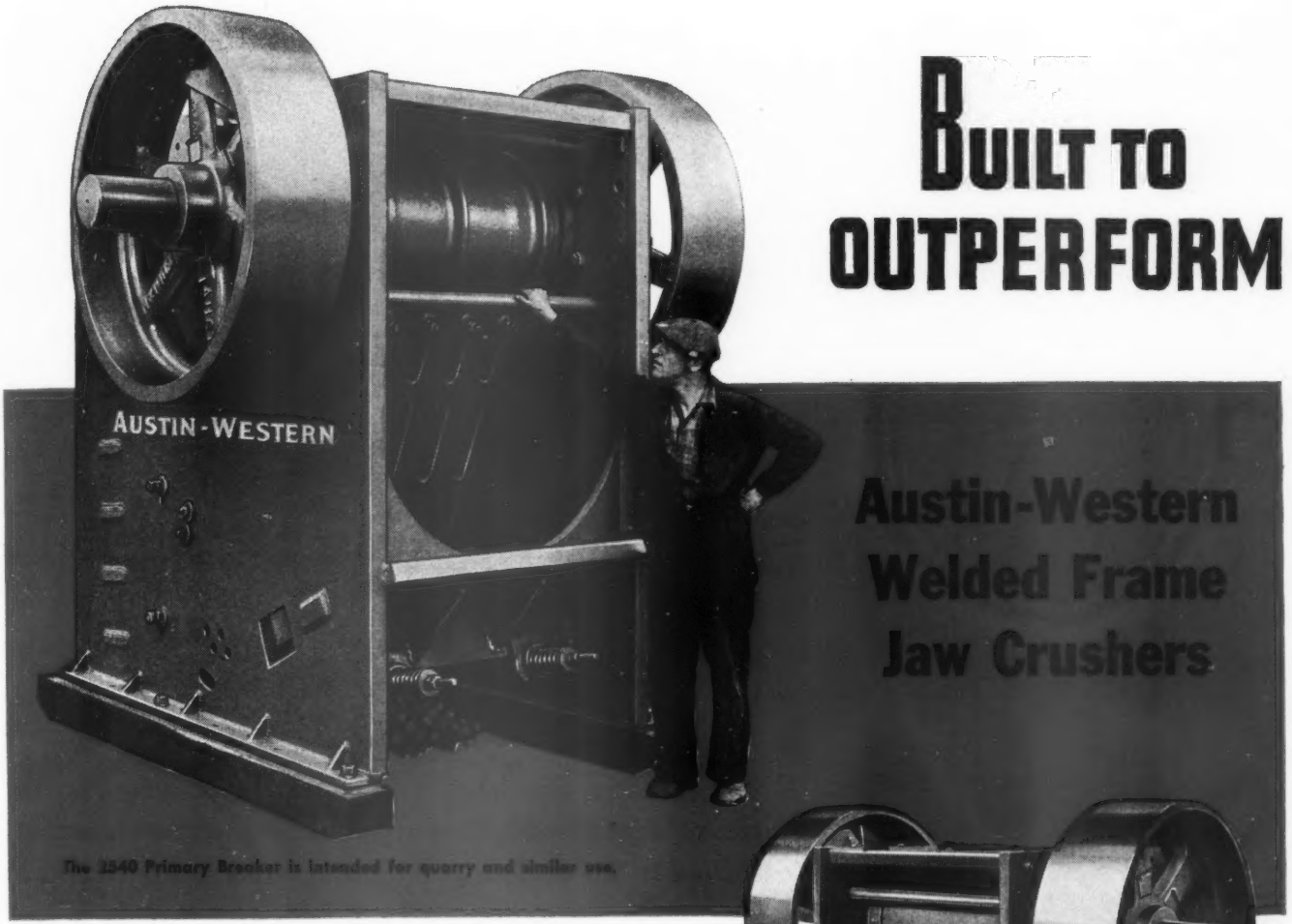
LUBRIPLATE DIVISION
FISKE BROTHERS REFINING COMPANY
SINCE 1870
Newark, N. J. Toledo, Ohio
DEALERS FROM COAST TO COAST

LUBRIPLATE

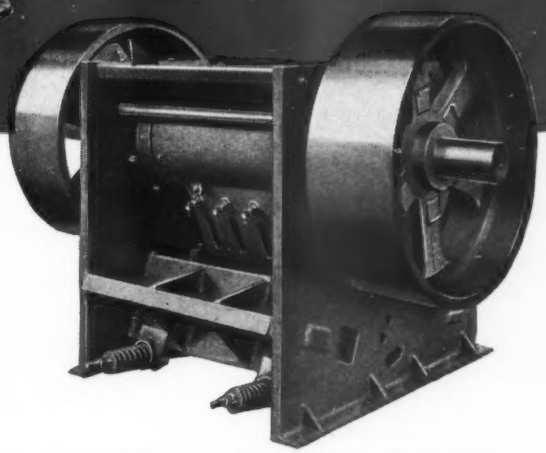
"Its the Film"

THE MODERN LUBRICANT *that Arrests Progressive wear*

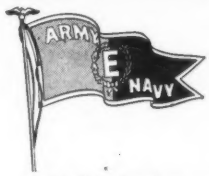
BUILT TO OUTPERFORM



The 2540 Primary Breaker is intended for quarry and similar use.

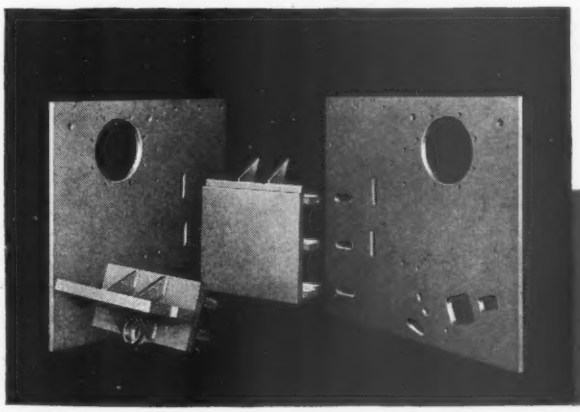


The 1036 General Purpose Crusher is suitable for gravel work, and also for reduction work in quarries.

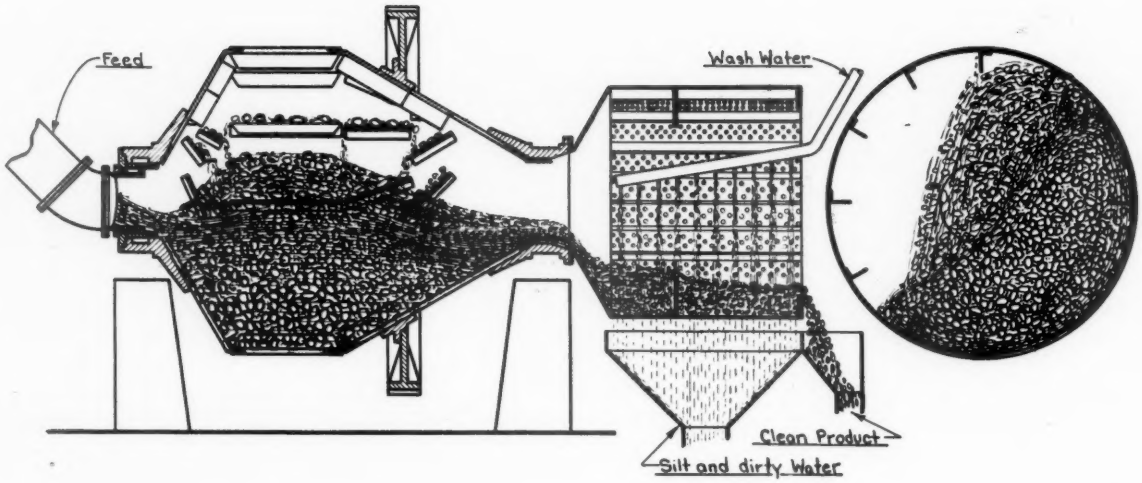


• **Wherever you expect to use a Crusher** . . . in a portable, semi-portable or stationary plant . . . bear in mind it is the one unit that has to withstand the roughest treatment (sledge-hammer punishment and shock) and that its performance therefore controls your profit as well as the amount and kind of aggregate you produce. Being the heart of the plant, crusher capacity must be adequate, and production steady, if lags in output are to be avoided. • Austin-Western has kept these considerations uppermost in mind throughout the engineering and building of its new line of Welded Frame Jaw Crushers. The eight models range in size from the 1016, smallest of the General Purpose Crushers, to the 2540 Primary Breaker. The whole story of these ultra-modern Jaw Crushers and their companion Roll Crushers is yours for the asking. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois, U.S.A.

These 1024 crusher parts show how side plates and cross members appear before they are fitted together, welded, machined.



BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859



For Cleaning Sand Stone and Gravel

The Hardinge Conical Scrubber is the only Scrubber that will remove large clay balls with a small amount of water.

HARDINGE EQUIPMENT	Bulletin No.
Agitators	31-C
Clarifiers	31-C
Classifiers, Air	17-B
Classifiers, Counter-Current	39-A
Classifiers, Hydro	31-C
Density Stabilizer	42
Digesters	36
Dryers	16-C
"Electric Ear"	42
Feeders, Belt	33-C
Feeders, Constant Weight	33-C
Feeders, Disc	33-C
Feeders, Drum	33-C
Feeders, Non-Flooding	33-C
"Feedometer"	43
Filters, Sand	30-A
Metal Reclamation	8-A
Mills, Batch	19-A
Mills, Conical Ball	13-D
Mills, Conical Pebble	13-D
Mills, Rod	25-B
Mills, Tube	18-A
Mixers, Slurry	31-C
Pumps, Diaphragm	32
"Ruggles-Coles" Dryers	16-C
Kilns and Coolers	16-C
Scrubbers, Conical	37
"Thermomill"	17-B
Thickeners	31-C

The Conical Scrubber consists of a rotating conical drum equipped with lifter flights and a trommel screen attached to the discharge trunnion. The drum rotates at a relatively high speed, 24 R.P.M. for a 7 ft. diam. scrubber.

A small amount of water is introduced with the feed and the cascading action of the mass breaks up the clay balls and scours the material. The scrubbed material with the dirty water flows into the screen where a water spray removes the dirty water and fines thru the screen. The cleaned dewatered material is discharged from the screen.

A 7 ft. by 48 in. scrubber is handling 60 tons per hour of minus $4\frac{1}{2}$ in. plus $2\frac{1}{2}$ in. river gravel to remove clay balls. This scrubber operates at 24 R.P.M. and is driven by a 75 H.P. motor. The maintenance on this scrubber over a period of years has been low.

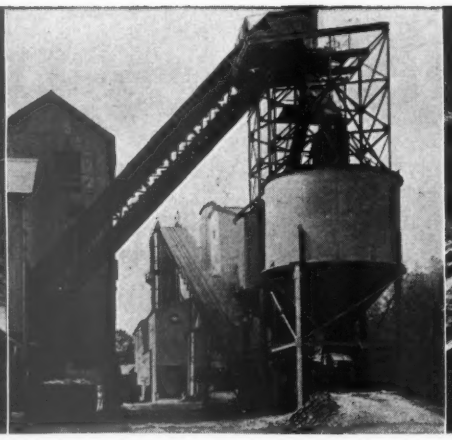
Write for Bulletin 37.

HARDINGE

COMPANY, INCORPORATED - YORK, PENNSYLVANIA

122 East 42nd Street, New York, N. Y.
205 West Wacker Drive, Chicago, Illinois
501 Howard Street, San Francisco, California
200 Bay St., Toronto, Ontario, Canada

Jeffrey combination pan conveyor and picking table. Handles burned lime from kiln to lime screening and crushing plant.



Jeffrey inclined bucket elevator handling kiln stone from crushing plant to storage bins. A Jeffrey steel apron conveyor handles flux stone from screens to railroad cars.

Jeffrey belt conveyors provide an uninterrupted flow of sand, crushed stone, lime, cement, etc. both in the quarry and the processing plant.

SPEED PRODUCTION
IMPROVE HANDLING METHODS

A faster way of doing the job . . . a quicker way to move materials and products. Today . . . as yesterday, the Jeffrey aim is to help you do that job better and to keep your plant modern and efficient. For high productivity . . . specify Jeffrey.

Chains	Feeders	Screens
Car Pullers	Grinders	Transmission Machinery
Conveyors	Idlers (belt)	Waytrols—accurate gravimetric feeding
Crushers	Pulverizers	
Elevators	Portables	

THE Jeffrey MANUFACTURING CO.

917-99 North Fourth Street, Columbus, Ohio

Established in 1877

BALTIMORE	CINCINNATI	HUNTINGTON	NEW YORK
BIRMINGHAM	CLEVELAND	HOUSTON	SCRANTON
BOSTON	DENVER	MILWAUKEE	SALT LAKE CITY
BUFFALO	DETROIT	PITTSBURGH	ST. LOUIS
CHICAGO	HARLAN	PHILADELPHIA	

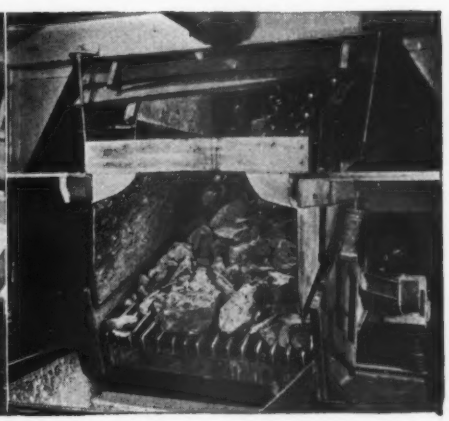
Jeffrey heavy duty bucket elevator and belt conveyor installation in a large quarry operation where high productivity is important.

Jeffrey portable bucket loaders are ideal and inexpensive for pit to truck loading or reclaiming from storage piles. Also portable belt and scraper conveyors.

Jeffrey Waytrol below—precision unit for accurate gravimetric feeding, batching and proportioning —may be remotely controlled.

Jeffrey Pulverizer installation (below) unit being fed by a Jeffrey steel apron conveyor. Also crushers and grinders.

Jeffrey-Traylor electric vibrating 5′ wide grizzly feeder (below). Controls feed and by-passes fines ahead of primary crusher.



11% MORE PAYLOAD

PMCO

WELDED DIPPERS

on HARNISCHFEGER-P & H SHOVELS

gives the added capacity that speeds construction on huge dam war project in southwest

QUICK FACTS ON SHOVEL CAPACITY					
	Empty Dipper Weight	Loaded Dipper Weight	Net Pay Load	Added Capacity of Shovel	Added Capacity Percentage
2½ yd. PMCO Welded Dipper	5125 lbs.	11,875 lbs.	6,750 lbs.	675 lbs.	11%
2¼ yd. Solid Cast Dipper	6000 lbs.	12,075 lbs.	6,075 lbs.		

ARMY E NAVY

CONSULT YOUR SHOVEL MAN

We operate the largest and most complete manganese steel foundry in the United States.

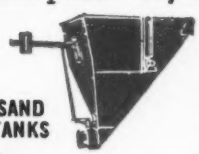
PETTIBONE MULLIKEN CORPORATION

Established 1880

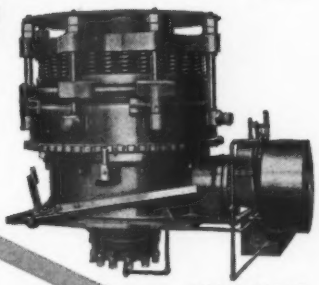
4710 West Division Street, Chicago 51, Illinois

TELSMITH GRAVEL PLANT and QUARRY *Equipment*

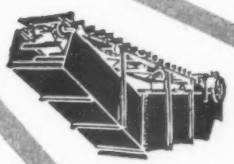
When you modernize, expand or build a new plant—Telsmith machinery is the right answer to your production problems. From crushers to bin gates, every unit is designed, engineered, and built "right" *by Telsmith.* And Telsmith selective engineering service fits it to do the job you want done at the lowest operating cost. To push production to new peaks—buy Telsmith. Get Bulletin E-15.



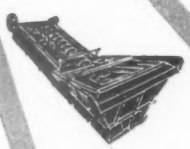
SAND TANKS



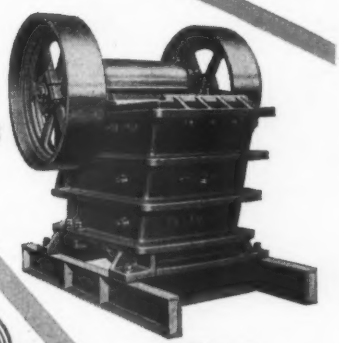
GYRASPHERE CRUSHERS



SAND DRAGS

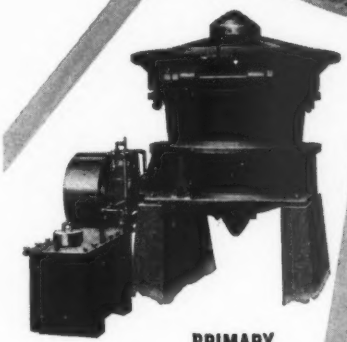


SAND CLASSIFIERS



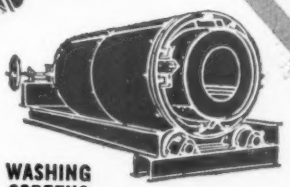
JAW CRUSHERS

BELT AND BUCKET ELEVATORS

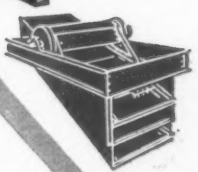


PRIMARY BREAKERS

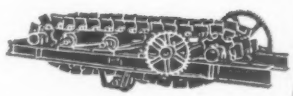
REDUCTION CRUSHERS



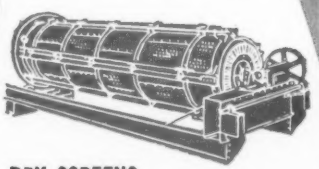
WASHING SCREENS



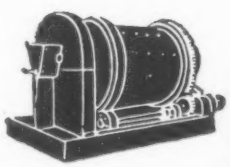
PULSATORS



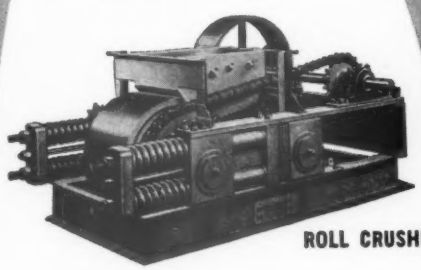
HEAVY DUTY FEEDERS



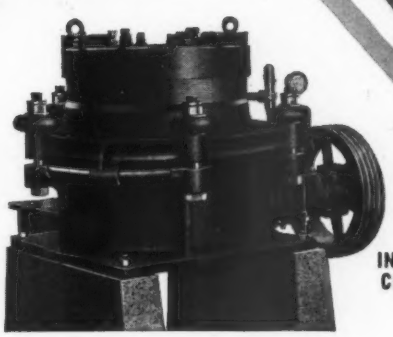
DRY SCREENS



SUPER SCRUBBERS



ROLL CRUSHERS



INTERCONE CRUSHERS

E-4

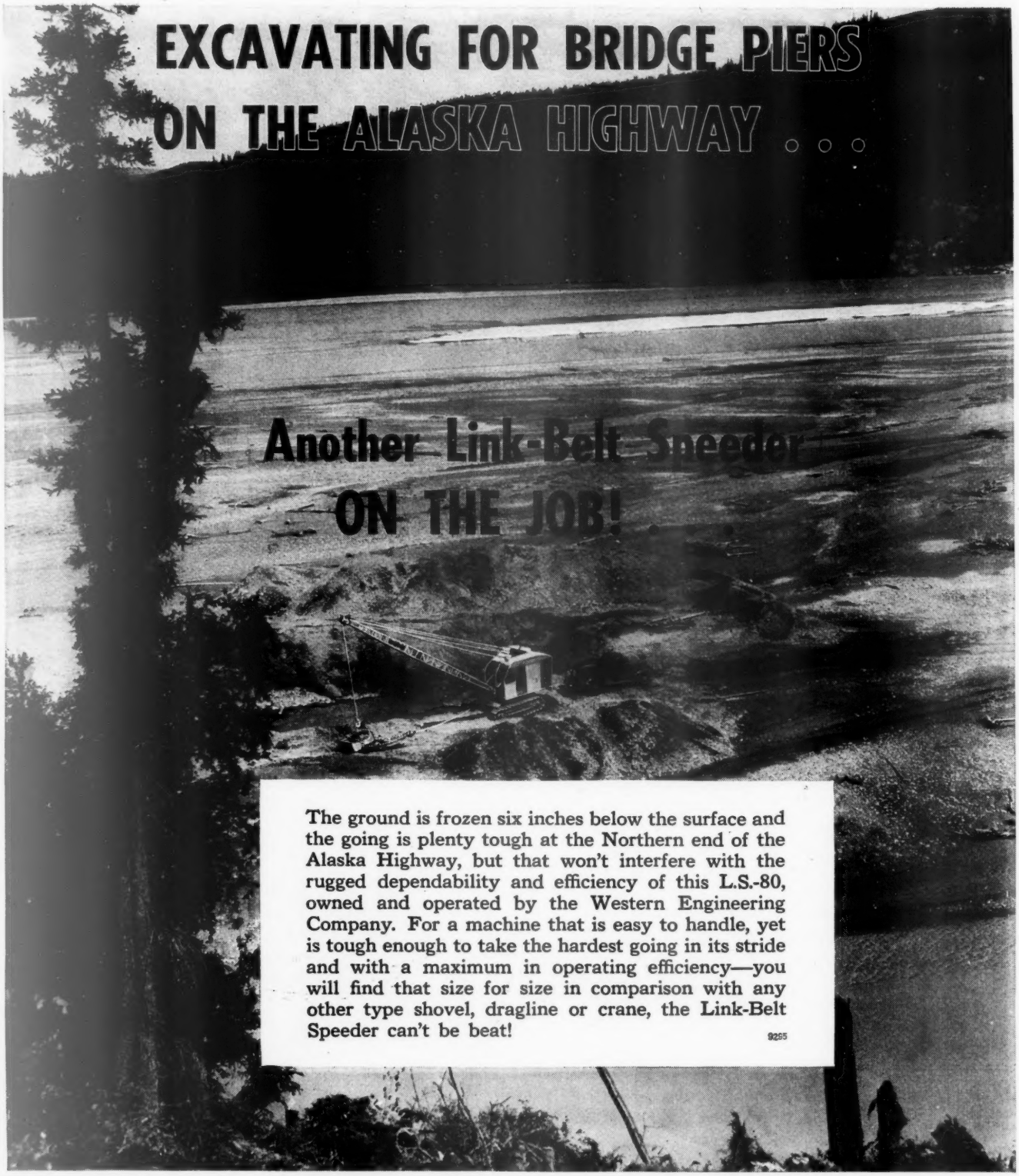
SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

Room 1604—50 East 42nd St. New York 17, N. Y. | 211 W. Wacker Drive Chicago 6, Ill. | 713 Commercial Trust Bldg. Philadelphia 2, Pa. | 19-21 Charles St. Cambridge 41, Mass. | G. F. Seeley & Co. Toronto, Ont. | Mines Eng. & Equip. Co. San Francisco 4—Los Angeles 14

Brandeis M. & S. Co. Louisville 8, Ky. | Charleston Tractor & Eqpt. Corp. Charleston 22, W. Va. | Roanoke Trac. & Eqpt. Co. Roanoke 7, Va. | Clift L. Priester 911 S. 3rd St., Memphis, Tenn. | Wilson-Weesner-Wilkinson Co. Knoxville 8 and Nashville 6, Tenn.

EXCAVATING FOR BRIDGE PIERS ON THE ALASKA HIGHWAY . . .



Another Link-Belt Speeder ON THE JOB!

The ground is frozen six inches below the surface and the going is plenty tough at the Northern end of the Alaska Highway, but that won't interfere with the rugged dependability and efficiency of this L.S.-80, owned and operated by the Western Engineering Company. For a machine that is easy to handle, yet is tough enough to take the hardest going in its stride and with a maximum in operating efficiency—you will find that size for size in comparison with any other type shovel, dragline or crane, the Link-Belt Speeder can't be beat!

9295

LINK-BELT SPEEDER

BUILDERS OF THE MOST COMPLETE LINE OF

SHOVELS-
CRANES-
DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.
(A DIVISION OF LINK-BELT COMPANY)

Simple, SYSTEMATIC DRIFTER LUBRICATION CUTS REPAIRS, BOOSTS FOOTAGE

Regular lubrication is a vital factor in the performance and service given by any drifter drill. It is particularly important today when the war effort and the scarcity of strategic materials demand the conservation of every piece of drilling equipment.

Here are four simple lubrication suggestions which will help you get the most out of your CP Drifters. While these suggestions apply particularly to CP MOTORdrifters they are applicable generally to other models. Detailed recommendations on hand-cranked CP Drifters will appear in future advertisements.

HOW TO GET MAXIMUM [illegible]

1 Twice each shift, fill the drifter oil reservoir with a good grade of rock drill oil.

2 Be sure to keep the piston feed oil cup filled with good grade of [illegible] oil.

3 Check the feed screw frequently. Keep an oil can handy, oil feed screw [illegible]

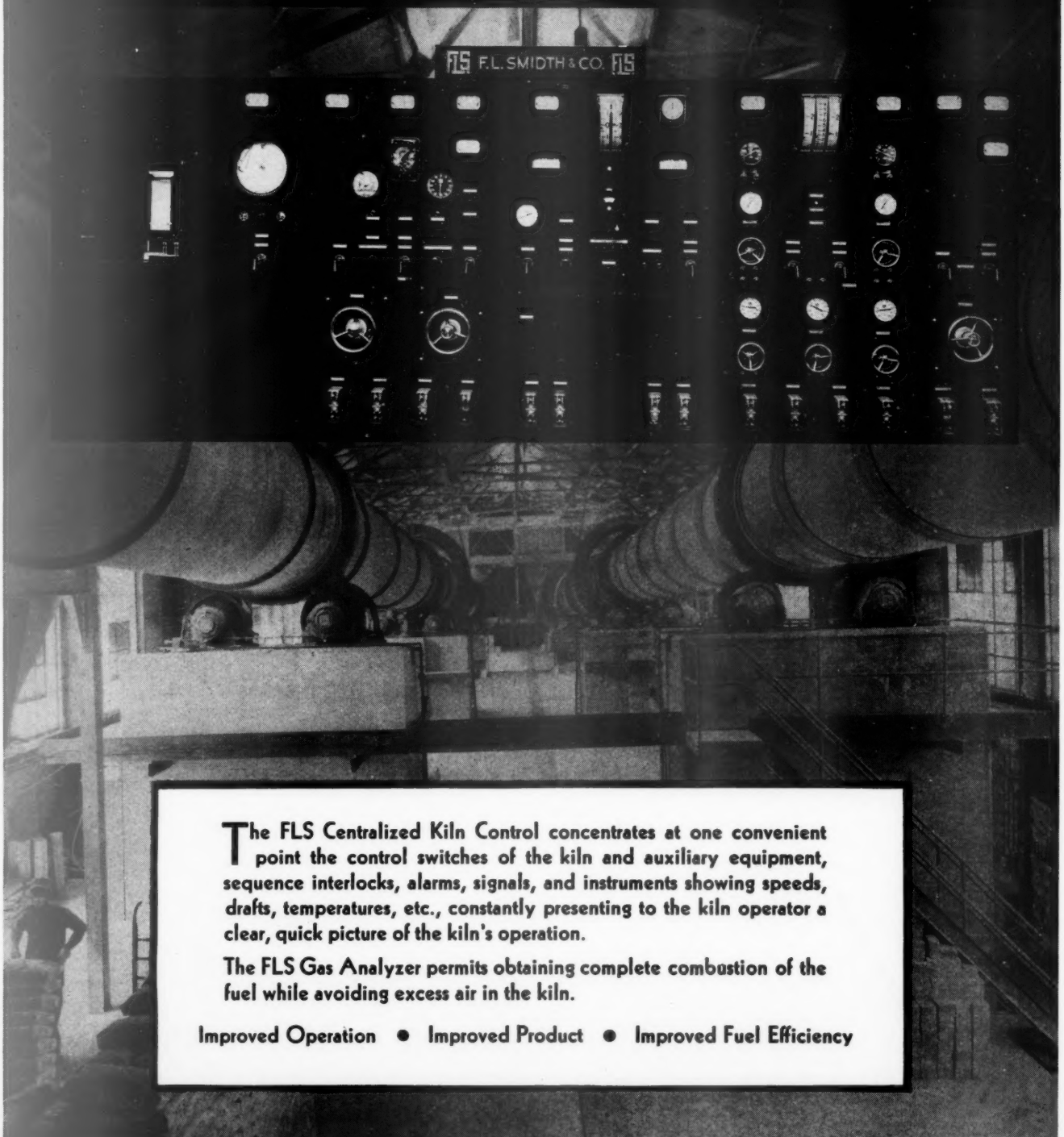
4 Before operating drifter, turn on air and make sure oil is blowing through exhaust.

★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
(Hicycle...Universal)
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

CENTRALIZED KILN CONTROL



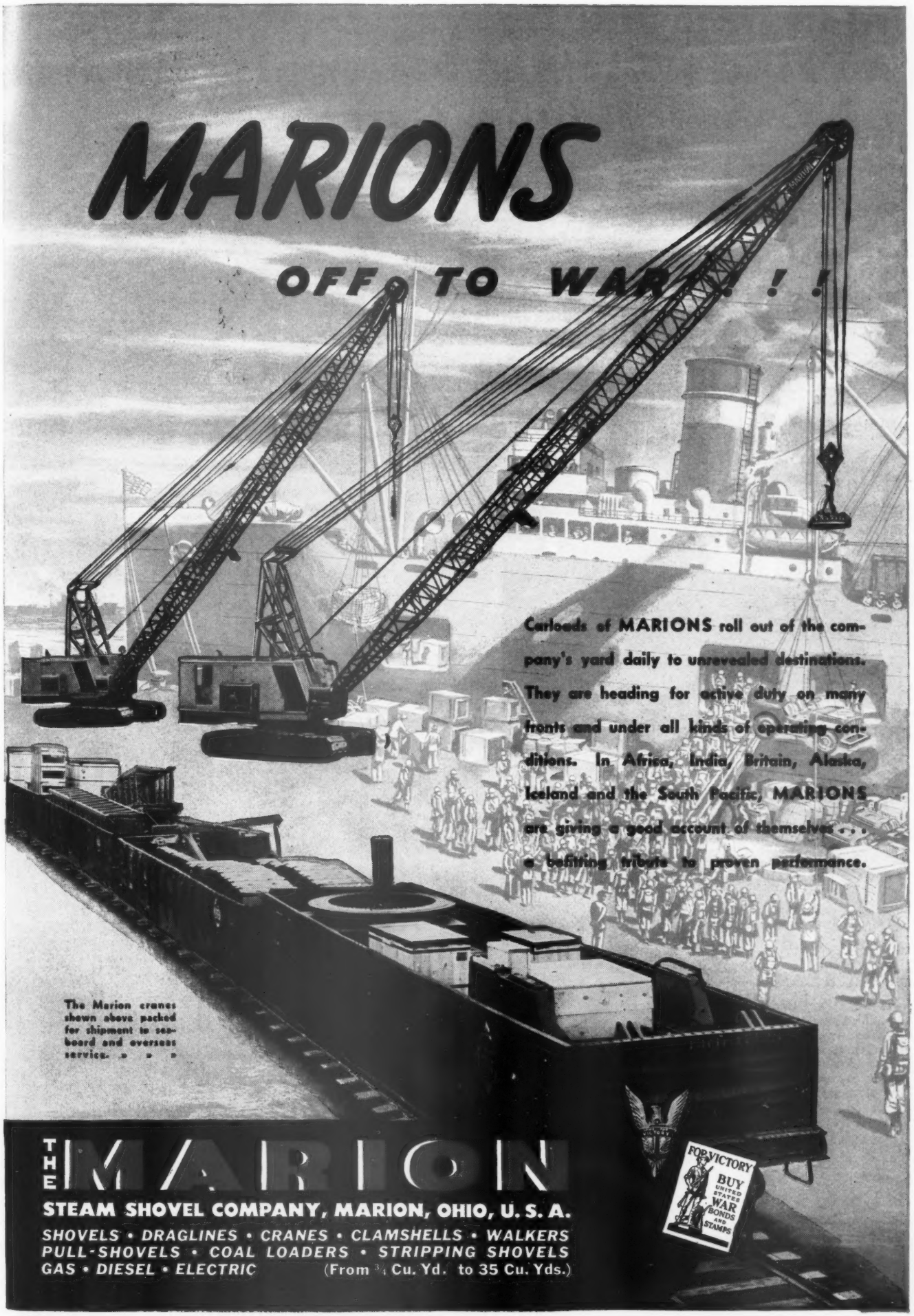
The FLS Centralized Kiln Control concentrates at one convenient point the control switches of the kiln and auxiliary equipment, sequence interlocks, alarms, signals, and instruments showing speeds, drafts, temperatures, etc., constantly presenting to the kiln operator a clear, quick picture of the kiln's operation.

The FLS Gas Analyzer permits obtaining complete combustion of the fuel while avoiding excess air in the kiln.

Improved Operation • Improved Product • Improved Fuel Efficiency

F. L. SMIDTH & CO.

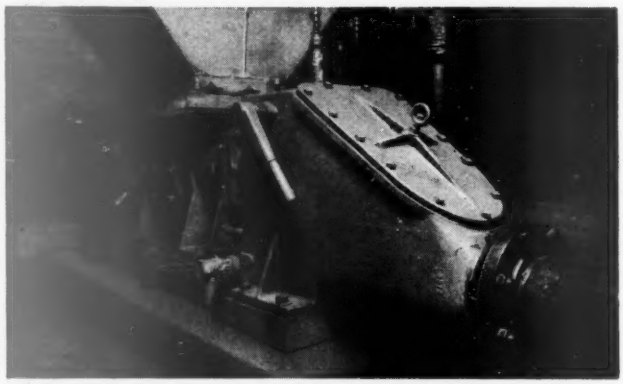
60 EAST 42ND STREET — ENGINEERS AND MACHINERY MANUFACTURERS — NEW YORK, N. Y.


MARIONS
OFF TO WAR ! ! !
Carloads of MARIONS roll out of the company's yard daily to unrevealed destinations. They are heading for active duty on many fronts and under all kinds of operating conditions. In Africa, India, Britain, Alaska, Iceland and the South Pacific, MARIONS are giving a good account of themselves . . . a befitting tribute to proven performance.
The Marion cranes shown above packed for shipment to seaboard and overseas service. » » »
FOR VICTORY
BUY UNITED STATES WAR BONDS AND STAMPS
THE MARION
STEAM SHOVEL COMPANY, MARION, OHIO, U. S. A.
SHOVELS • DRAGLINES • CRANES • CLAMSHELLS • WALKERS
PULL-SHOVELS • COAL LOADERS • STRIPPING SHOVELS
GAS • DIESEL • ELECTRIC (From ¾ Cu. Yd. to 35 Cu. Yds.)

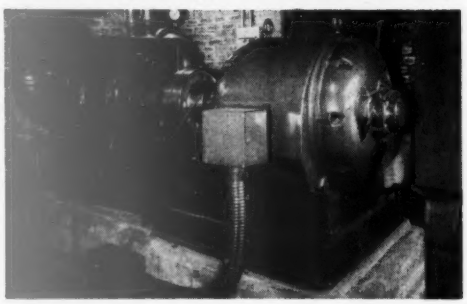
Unloading and Conveying Pulverized and Finely Divided Materials from Box and Hopper-Bottom Cars

Fuller-Kinyon Stationary Pumps are being used for unloading from both box and hopper-bottom cars through a simple arrangement.

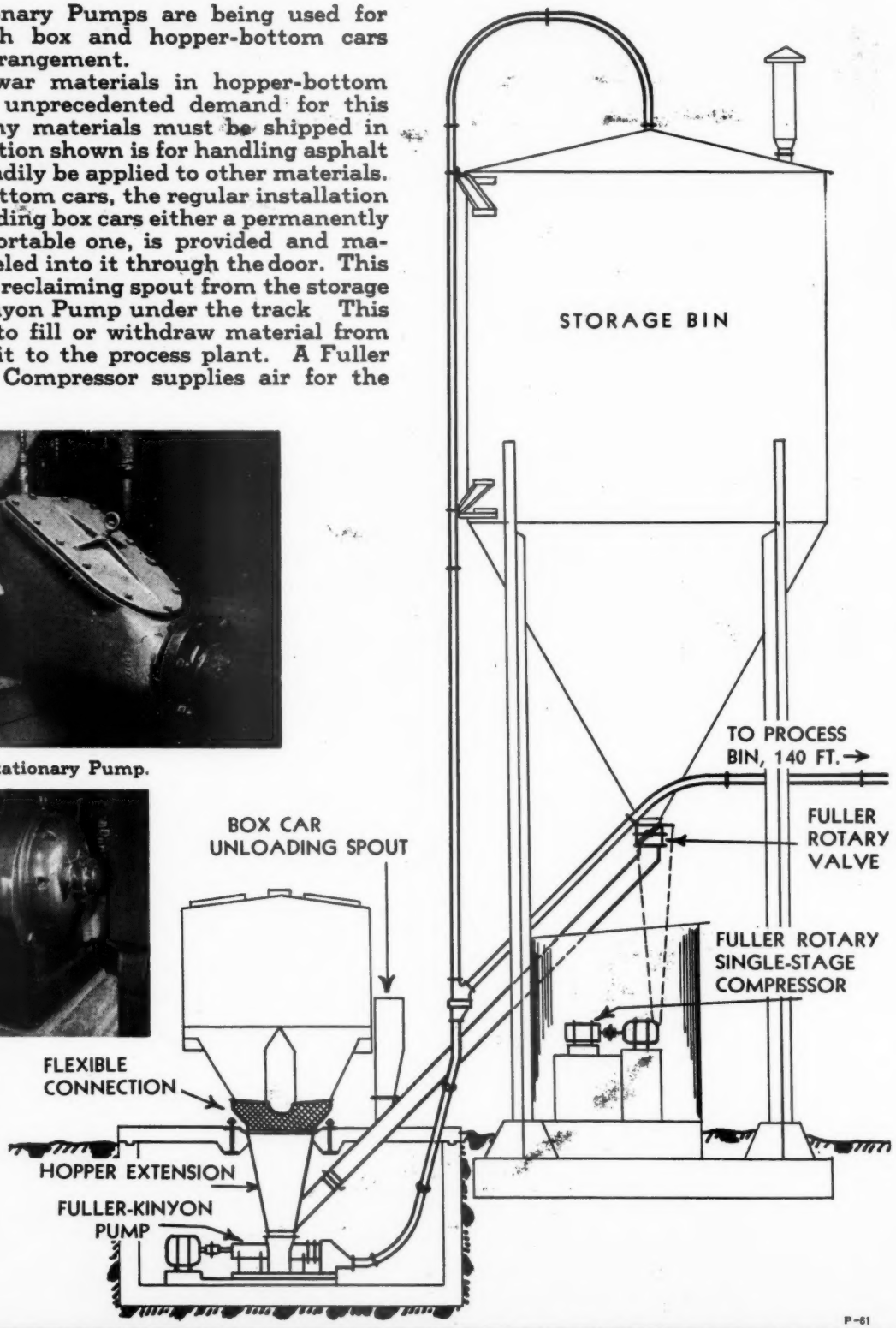
The handling of war materials in hopper-bottom cars has caused an unprecedented demand for this type of car and many materials must be shipped in box cars. The installation shown is for handling asphalt filler dust but can readily be applied to other materials. Unloading hopper-bottom cars, the regular installation is used. When unloading box cars either a permanently attached spout, or portable one, is provided and material plowed or shoveled into it through the door. This spout discharges to a reclaiming spout from the storage bin to the Fuller-Kinyon Pump under the track This pump may be used to fill or withdraw material from the bin and convey it to the process plant. A Fuller Rotary Single-stage Compressor supplies air for the conveying system.



Fuller-Kinyon Type H Stationary Pump.



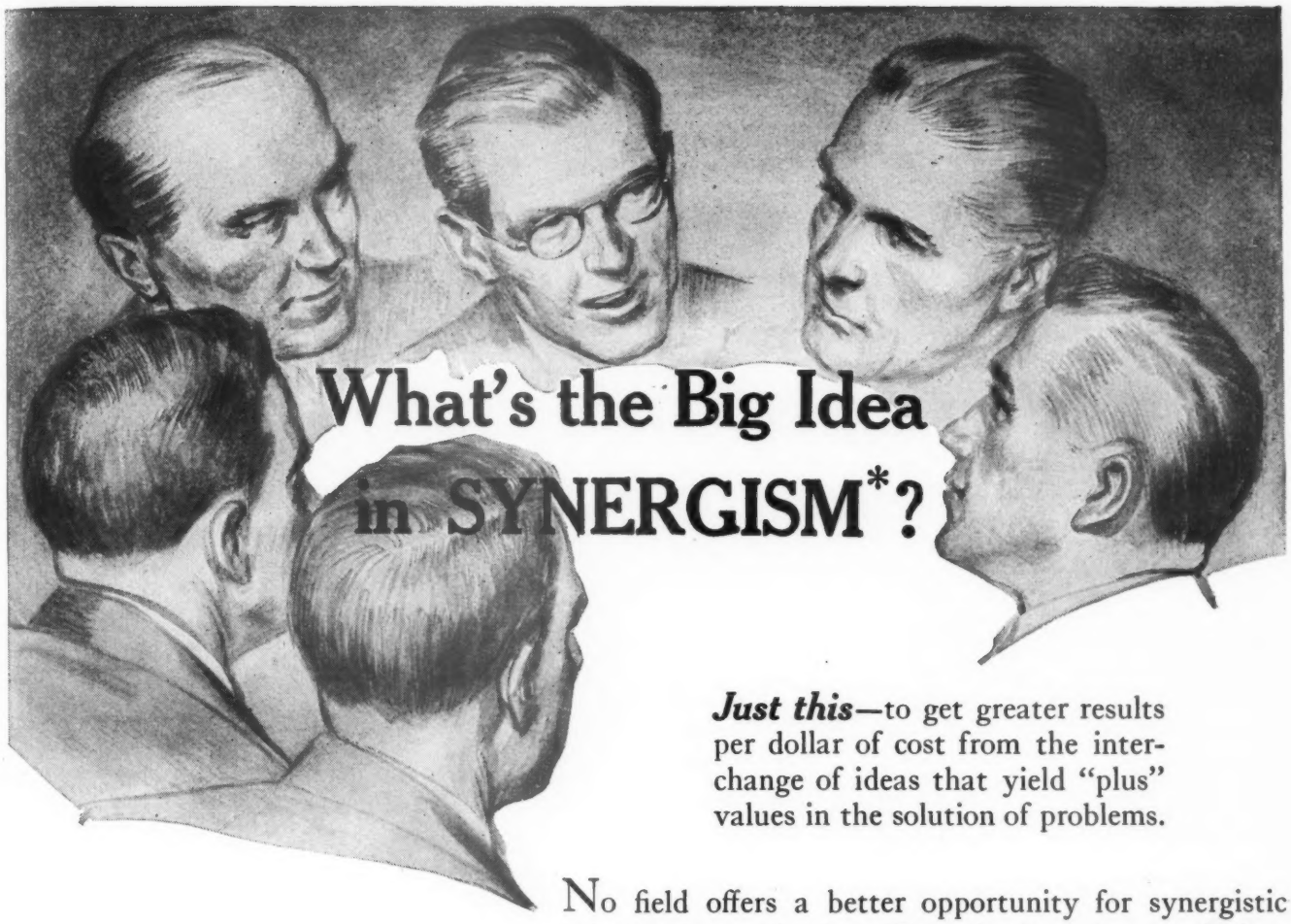
Fuller Rotary Single-stage Compressor of the type used in the installation illustrated . . . air when and where needed and at pressures to do the work most economically.



P-81

FULLER COMPANY-CATASAUQUA, PA.

CHICAGO, 3 Marquette Bldg. | WASHINGTON, 5, D. C. Colorado Bldg. | SAN FRANCISCO, 4 Chancery Bldg.



What's the Big Idea in SYNERGISM*?

Just this—to get greater results per dollar of cost from the interchange of ideas that yield "plus" values in the solution of problems.

No field offers a better opportunity for synergistic thinking than blasting. Here the interchange of ideas in overcoming problems can uncover a world of "plus" values . . . new and better methods and devices, greater production, lower costs.

Consider the problem of conserving irreplaceable equipment when the accent is on production. Using a little more powder is not necessarily a waste today—it may get longer, more efficient life from your equipment.

Maybe you don't need *more* powder, but do need a *different* powder. This, conceivably, could mean even less powder.

Synergism can give a "2 + 2 = 5" answer. Over a hundred grades of Atlas explosives are available. Their range of effectiveness is limited only by the synergistic thinking applied to them.

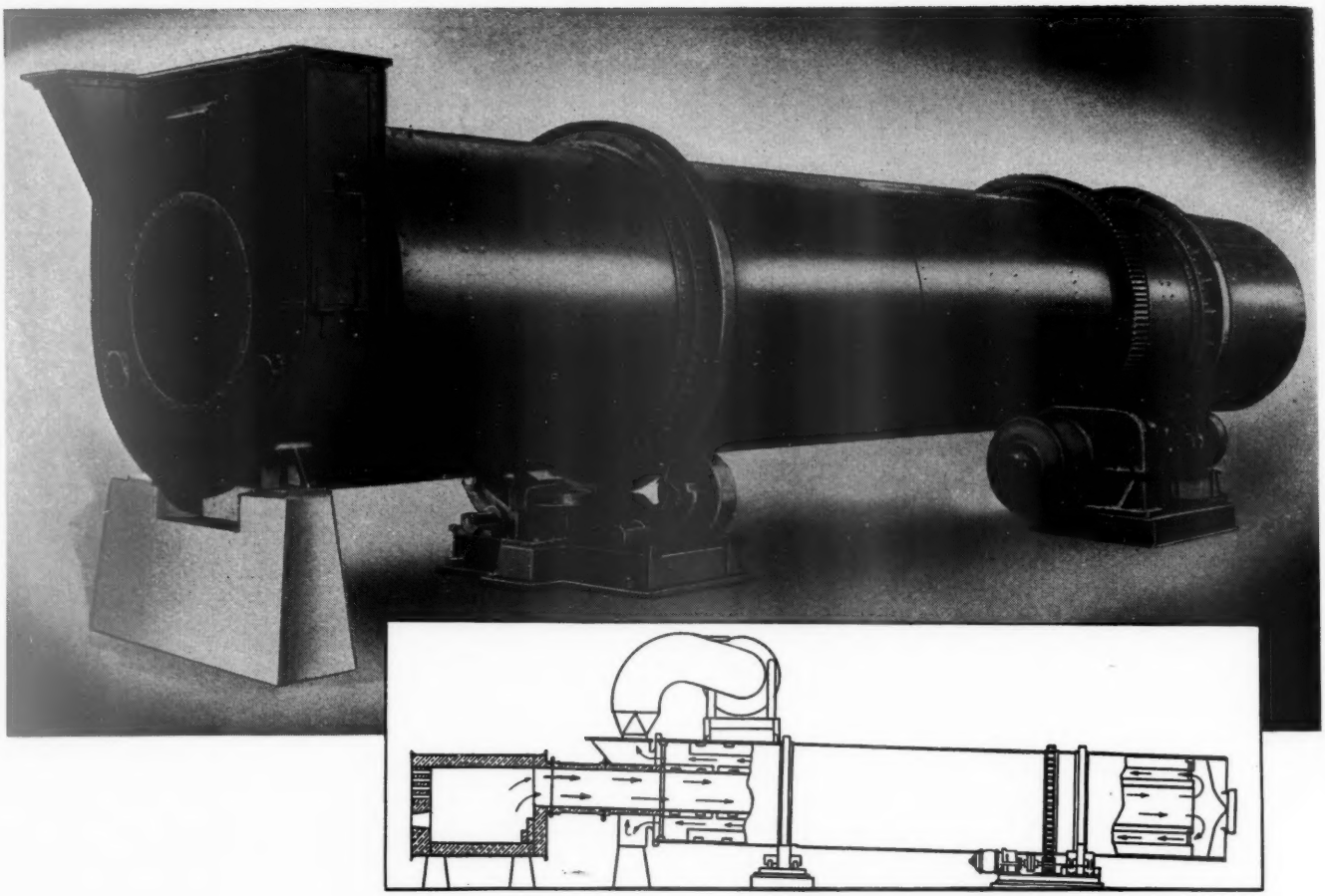
***Synergism**—the meeting of minds "clicking together" from the impact of ideas to give a result greater than the sum total of the ideas expressed —a "2 plus 2 equals 5" result. Synergism is a big help in making your equipment last longer.*

If you have a blasting problem, we would like to try synergistic thinking with you.

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco



YORK DOUBLE SHELL DRYER

• For Efficiency

The high thermal efficiency and resulting economy of operation of the York Dryer is unsurpassed. Double Shell design permits the hot gases, passing direct from the furnace into the outer shell, first to dry and pre-heat the material by radiation. Then, passing directly through the inner flue the gases absorb moisture just before leaving the dryer, completing the drying process.

This design gives high fuel efficiency by utilizing heat transfer and moisture absorption to the utmost. Exhaust temperatures are relatively very low with consequent fuel economy. Built in nine standard sizes, York Double Shell Dryers are mounted on heavy duty bases, equipped with steel tires.

• For Economy

If you have a special processing problem, take it to McGann. Engineering design and manufacture is carried out entirely in our own shops—by our own experts—who have solved many difficult drying problems over a period of more than 40 years. These facilities are at your disposal. Call or write today . . .

OTHER McGANN PRODUCTS—Lime Plants Complete, Hydrators, Shaft Kilns, Rotary Kilns, Drying Machinery, Tanks, Bins, Grey Iron Castings, Sugar Machinery, Special Machinery from Engineer's Designs

☆ ☆ **LIME & HYDRATE PLANTS CO.** ☆ ☆

Associate **McGANN MANUFACTURING COMPANY, INC.** *York, Pa.*

EXIDE

ease of maintenance means greater "off-the-highway" efficiency

Follow these rules of battery care:

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery maintenance problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 2399.

BATTERIES take a beating in "off-the-highway" operations. That's only natural when you stop to think of the heavy equipment used . . . and the difficult conditions under which work is done.

It's fortunate for the operators of bulldozers, tractors, cranes, and similar machines that Exide is a specialist in making rugged batteries . . . and that these same batteries are easy to keep at top-peak efficiency. An Exide will deliver its surging power under Arctic or Tropical conditions. Day in and day out, you can depend on your Exides for faster cranking.

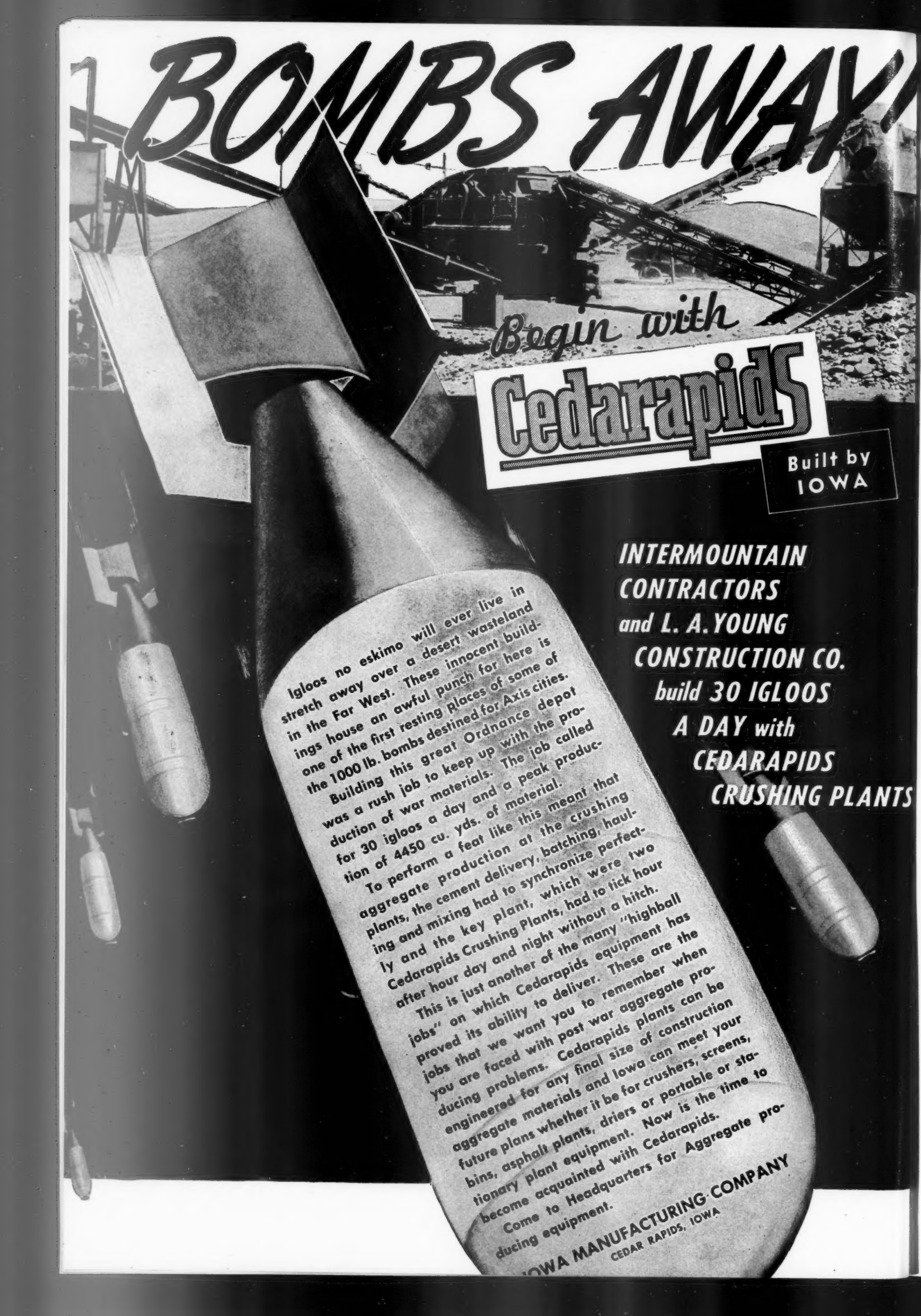
Naturally, since Exide Batteries are first-rank war weapons, you'll want to prolong their already long lives. Above are the rules which will do the job. Buy to Last . . . and Save to Win.

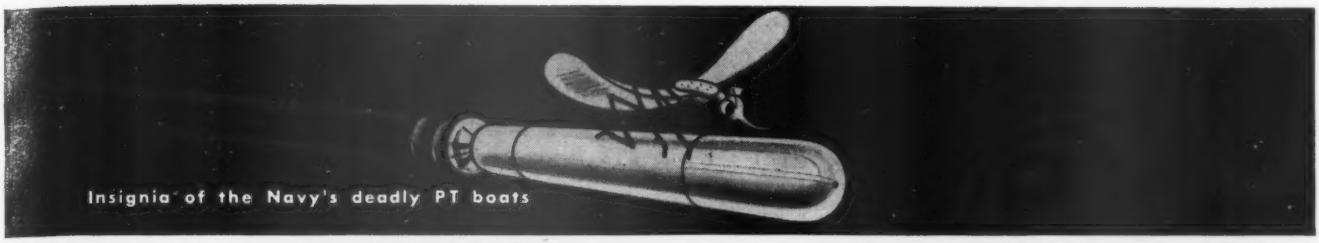
BUY TO LAST
SAVE TO WIN

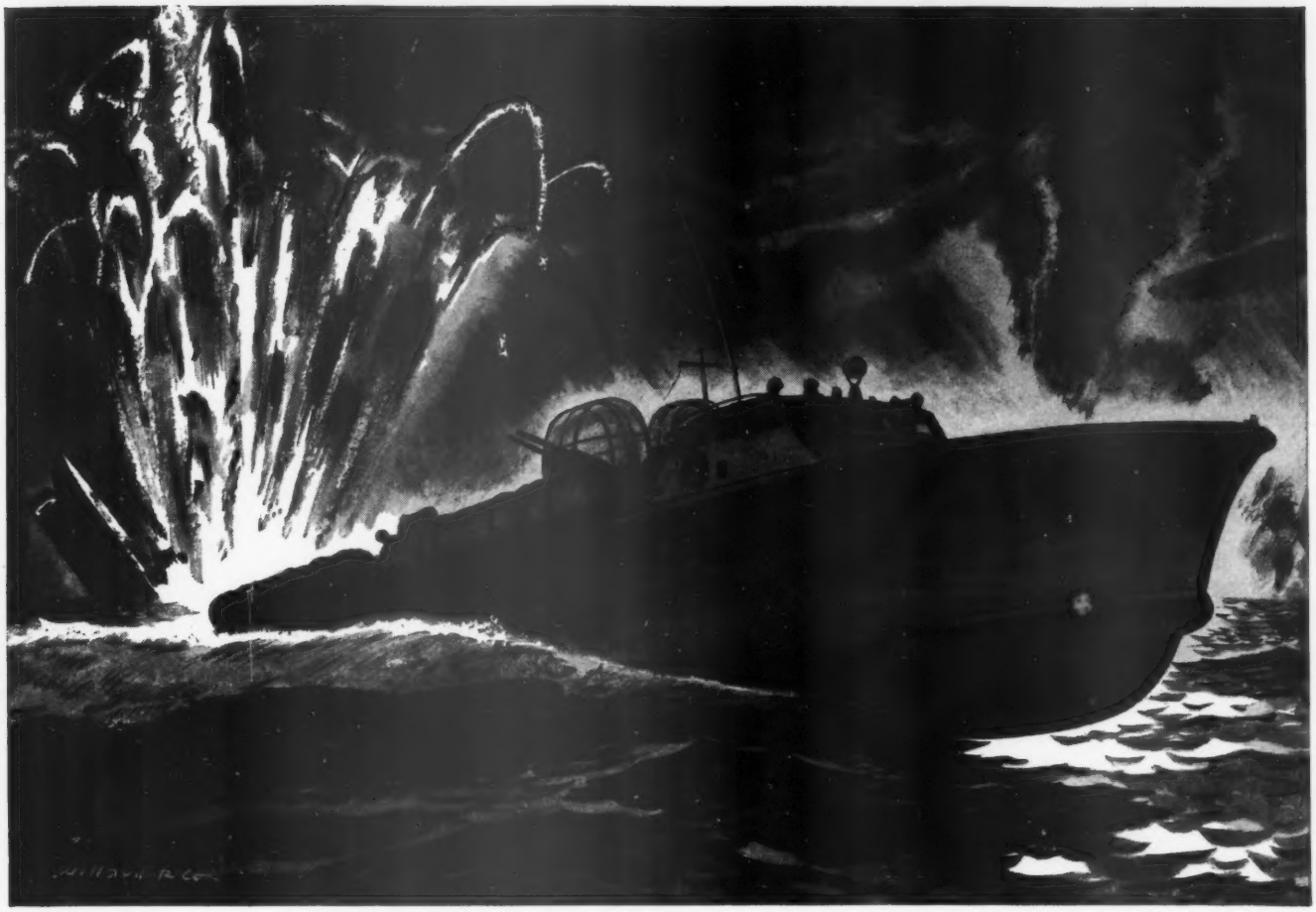
THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
Exide Batteries of Canada, Limited, Toronto

Exide
HEAVY DUTY
BATTERIES

BACK THE ATTACK WITH WAR BONDS


BOMBS AWAY!
Begin with
Cedarapids
Built by IOWA
INTERMOUNTAIN CONTRACTORS and L. A. YOUNG CONSTRUCTION CO. build 30 IGLOOS A DAY with CEDARAPIDS CRUSHING PLANTS
Igloos no eskimo will ever live in stretch away over a desert wasteland in the Far West. These innocent buildings house an awful punch for here is one of the first resting places of some of the 1000 lb. bombs destined for Axis cities. Building this great Ordnance depot was a rush job to keep up with the production of war materials. The job called for 30 igloos a day and a peak production of 4450 cu. yds. of material. To perform a feat like this meant that aggregate production at the crushing plants, the cement delivery, batching, hauling and mixing had to synchronize perfectly and the key plant, which were two Cedarapids Crushing Plants, had to tick hour after hour day and night without a hitch. This is just another of the many "highball jobs" on which Cedarapids equipment has proved its ability to deliver. These are the jobs that we want you to remember when you are faced with post war aggregate producing problems. Cedarapids plants can be engineered for any final size of construction aggregate materials and Iowa can meet your future plans whether it be for crushers, screens, bins, asphalt plants, driers or portable or stationary plant equipment. Now is the time to become acquainted with Cedarapids. Come to Headquarters for Aggregate producing equipment.
IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA





What makes a mosquito buzz?

Muffled motors roar suddenly as the PT boat starts her sprint. Almost before tracers arch from the enemy cruiser, the Yankee Mosquito knifes in, lays her long, lethal egg and bounces away at a wide open 70 knots. Scratch another Nip cruiser.

Such hit and run fighting demands motors that don't miss. They must hum flawlessly to take a 77-foot cockleshell under enemy guns. And PT motors *don't* miss—RPM DELO helps guarantee that.

Developed to solve the special problems of Diesel lubrication, RPM DELO ends the danger of stuck rings. It actually cleans motors gummed by other oils. RPM DELO's special additives guard bearings against corrosion, minimize sludge, cut wear to a fraction.

If you're interested in slicing repairs as much as 50%, in doubling the time between Diesel overhauls, remember the lubricant that helps make the Navy's Mosquito boats buzz.

ORDER RPM DELO FOR YOUR DIESELS

RPM DELO is marketed under these names:

RPM DELO
Caltex RPM DELO
Kyso RPM DELO
Signal RPM DELO
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Imperial-RPM DELO
CONCENTRATE

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity

STANDARD OIL COMPANY OF CALIFORNIA

Look Into a Kennedy Reduction Ball Bearing Gearless Crusher

OUTSTANDING POWER TRANSMISSION

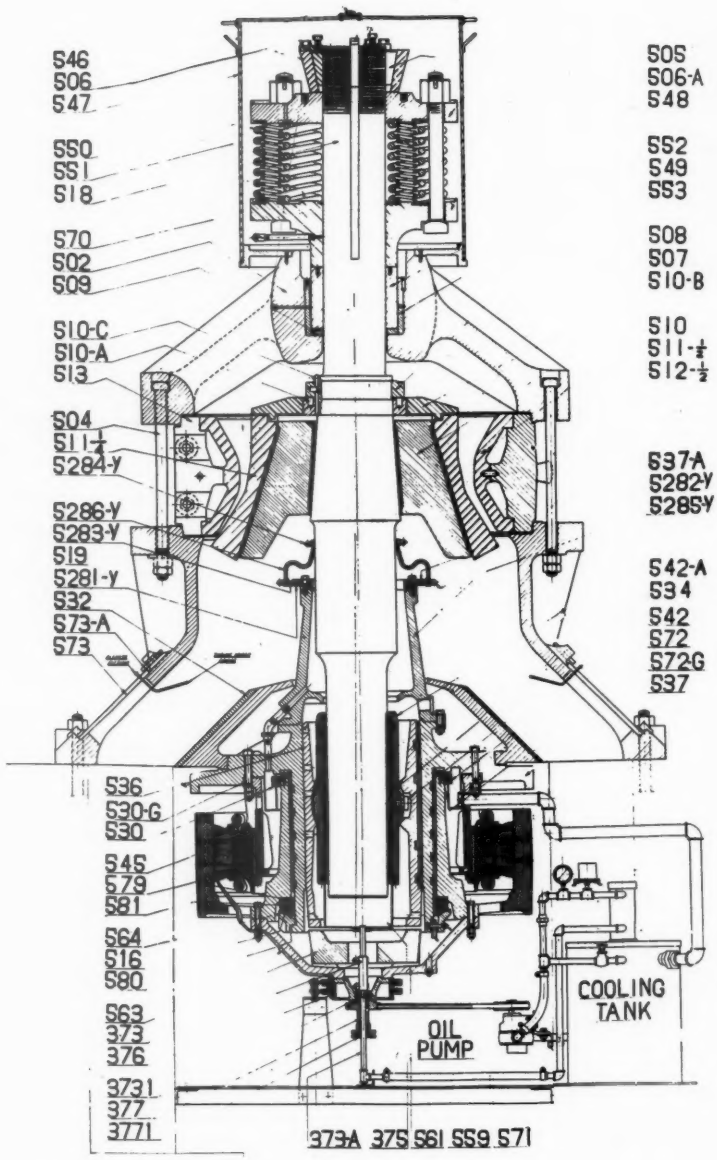
Power applied simply and directly saves in requirement to actually crush stone.

The gearless crusher equipped with a synchronous motor built in the pulley constitutes the most modern drive for a crusher. The motor has a 250% starting torque and 300% pullout torque enabling the starting of the crusher when full of stone. A gearless crusher with built-in motor can crush stone with less motor horsepower because there is no train of gears which waste power. The motor being built in the pulley adds additional weight to the pulley which in turn acts like a flywheel and builds up kinetic energy assisting the motor over the peaks. Power is applied only for crushing; none is wasted in belts or gears. No motor foundation is required. Motor runs on ball bearings and is continuously lubricated. It is built specially for this crusher duty and is the finest motor available.

The weight of the motor, pulley and all moving parts of the crusher are carried on oversized ball bearing, which assures a smooth operating and silent machine.

The eccentricity to the shaft is transmitted to a self-aligning ball socket bearing which maintains equal pressure and bearing surface regardless of the position of the shaft. Simple, direct and positive application of power results in more tons per horsepower.

SEND FOR BULLETIN "M"



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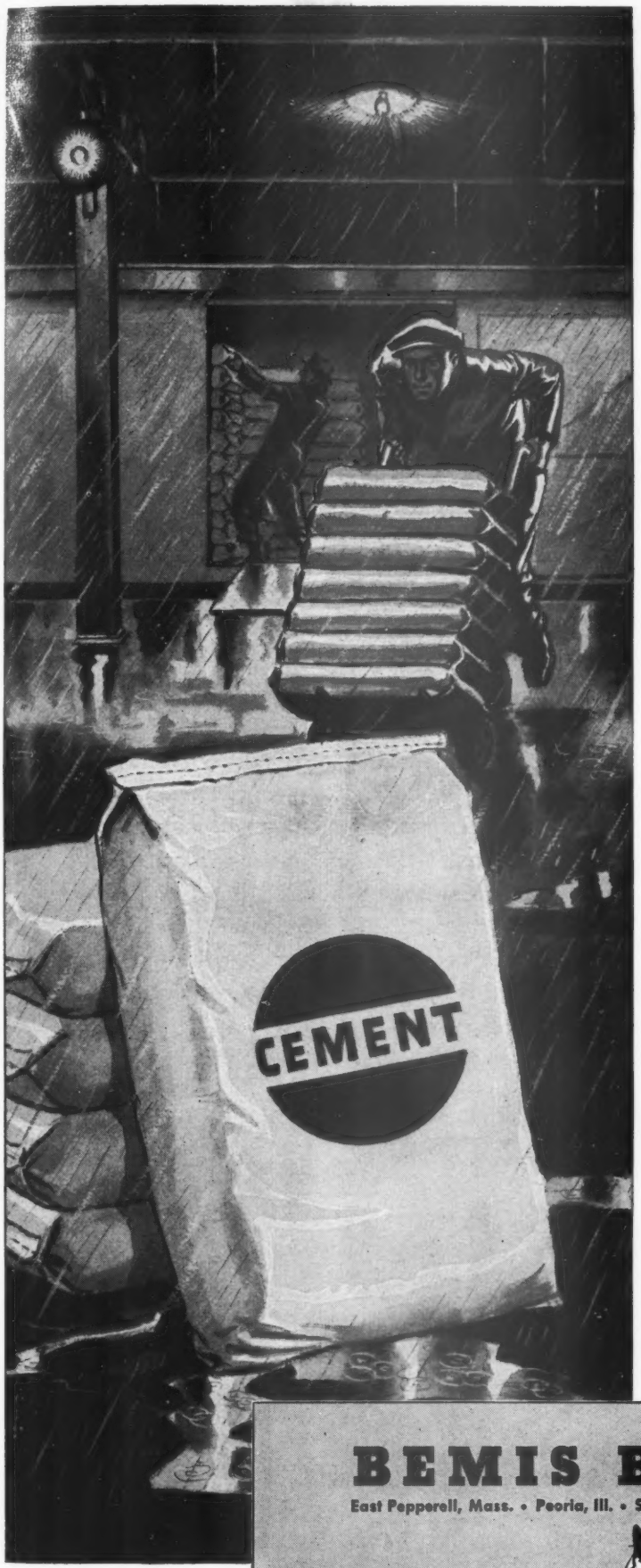

TRY THIS!

and prove to yourself that BEMIS MULTIWALL PAPER BAGS are showerproof

TAKE a Bemis Multiwall Paper Bag, filled with your cement, and set it out in the weather. Let it rain . . . let it pour! (If the air is filled with sunshine around your plant, use a hose to simulate rain.)

After you're convinced that the bag has been in more weather than it ever will have to stand in ordinary use, let it set 'til it's dry. Then open it, and see how freely the cement pours out!

Protection against sudden showers is only *one* advantage of using Bemis Multiwall Paper Bags to package your cement. You'll find that these containers are economical . . . that they have strength to reduce lost time due to breakage on the production line . . . that they have ruggedness to protect your product in transit and on the job.

We'd like to have you know about the qualities of Bemis Multiwall Paper Bags before you place another bag order. So, we suggest you try this experiment soon. We'll send sample bags for the trial, if you'll ask for them. No charge and no obligation, of course.

BEMIS BRO. BAG CO.

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OFFICES: Baltimore • Boston
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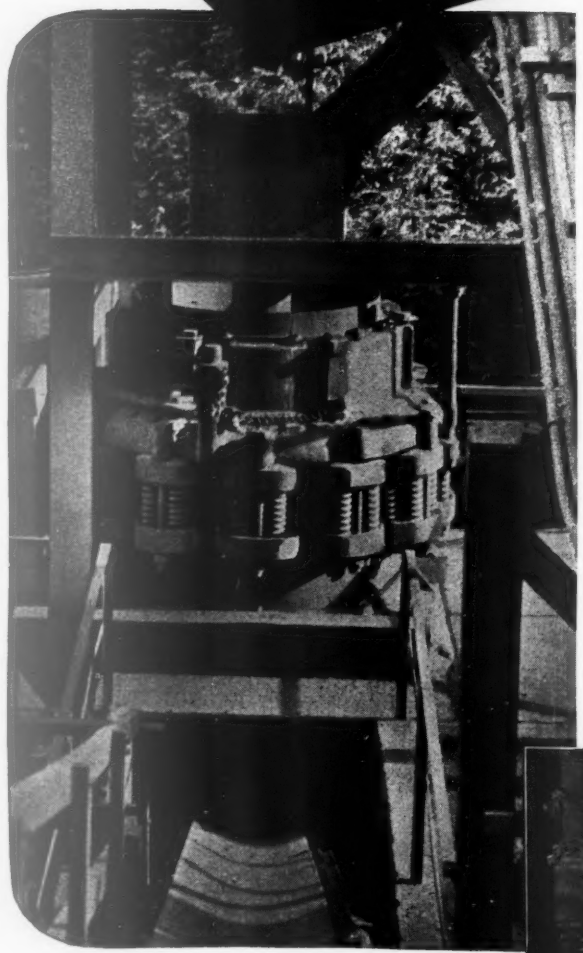
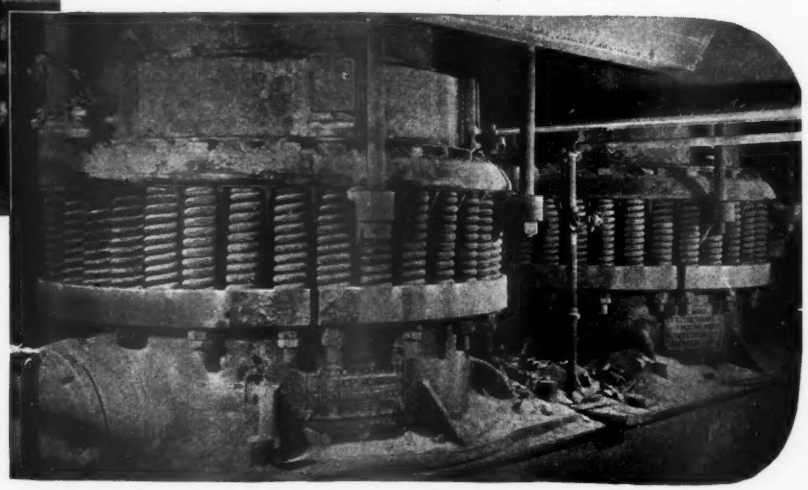
Indianapolis • Kansas City • Los Angeles • Louisville • Memphis
Minneapolis • New Orleans • Norfolk

SYMONS SHORT HEAD CONE—now supplies that finer sized stone



A four-foot Short Head Cone makes the minus ¾ inch material.

Here is another instance where a Symons Short Head Cone has been added to meet the changing demand for finer crushed material. The two Standard Cones were originally installed to take a 2 to 4 inch feed and make all the finer sizes then required. With an increased use of more material ranging in sizes from minus ¼ inch to minus ¾ inch, the Standard Cones are now only making the ¾ to 1½ inch sizes, while the Short Head Cone is taking the discharge from the Standards and supplying the finer products. The Short Head Cone is arranged to operate independently of the main plant, taking the surplus of any size in storage and readily producing any of the finer sizes for which there is a ready market. This combination of Symons Standard and Short Head Cones permits of greater flexibility and economy of operation and a lower crushing cost, and is the answer to meeting present day demands for the finer sizes of crushed materials.



Two four-foot Standard Cones do the ordinary reduction crushing.

NORDBERG
MFG. COMPANY
MILWAUKEE 7, WIS.

NEW YORK — LOS ANGELES
TORONTO, CAN. — LONDON, ENG.

SYMONS CONE CRUSHERS

Your name is spelled "V"! with a

JAVANESE . . . We didn't know you very well. We used your rubber . . . we nicknamed our coffee "Java" . . . and the newsreels showed us the beauties of city and jungle in your far-eastern island. But now that your paradise is in the clutches of the black-hearted Japs, we realize that your love of liberty is as real as our own.

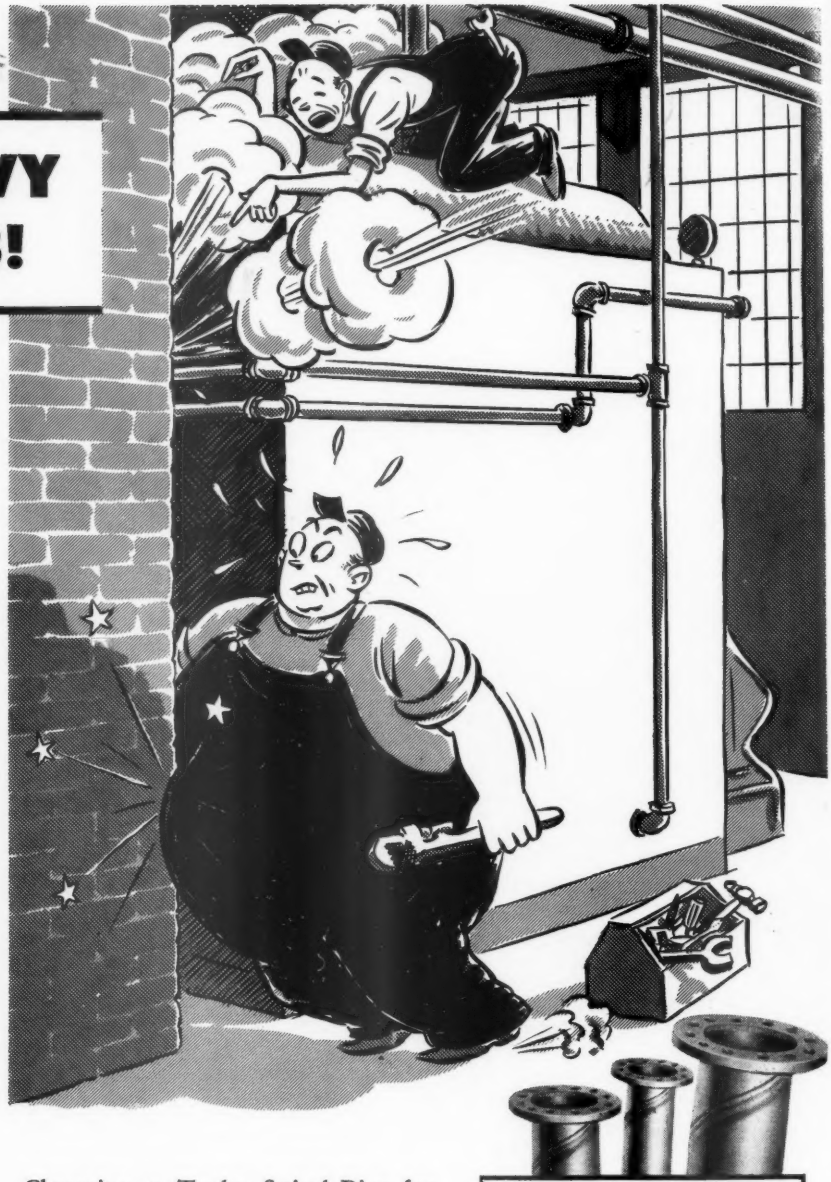
That "V" in your name is a symbol of Victory . . . the Victory which we and our allies will help you win. We're working toward it now in mill and factory . . . and in mine and quarry. In mines where coal and ore and stone are blasted out of the earth. For such key men our own skilled workers are producing essential equipment —Ensign-Bickford Safety Fuse and Primacord-Bickford Detonating Fuse—to hasten mining production and promote safety.

Victory Begins Underground!

THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT J-P

Primacord-Bickford
Detonating Fuse

A LITTLE HEAVY FOR THE JOB!



YOU can walk into almost any plant and find a lot of pipe that is more than a little too heavy for its job. And the too heavy pipe wouldn't be the so-called "Extra Heavy" kind either; for such pipe is generally used only to meet extreme conditions. Paradoxically enough, it would be just the plain, everyday "Standard Thickness" pipe that is used for the general run of low or moderate pressure services like those listed below.

Admittedly Standard Thickness pipe takes care of such services well enough. But it wastes steel and dollars for the simple reason that its job could be handled equally well by a pipe that weighs far less and costs in many cases only about half as much installed.

This pipe is Taylor Spiral. Hundreds of plants have found that Taylor Spiral Pipe can handle a large percentage of piping requirements with strength and service life to spare. The big savings it effects is the only reason you would need for changing to Taylor Spiral Pipe for much of your moderate and low pressure piping. But today you have an even better reason—the conservation of vital steel.

Changing to Taylor Spiral Pipe for services like those listed is made easy by the complete range of sizes and wide variety of fittings. Thicknesses range from 18 to 6 gauge; sizes from 4″ to 42″; joint lengths up to 40 ft. All types of end joints and couplings, all kinds of fittings and specials or fabricated assemblies, are produced by Taylor Forge, assuring a complete service and undivided responsibility.

Change to TAYLOR SPIRAL PIPE for:

- High and Low Pressure Water Lines.
- Low Pressure Steam and Air Lines.
- Steam and Diesel Exhaust Lines.
- Vacuum and Suction Lines.
- Blower Piping.
- Sand and Gravel Lines.
- Industriial Gas Lines.
- Oil and Gas Gathering Lines.
- Swing Pipe.
- Spray Pond Piping.
- Hydraulic Mining.
- Dredge Lines.

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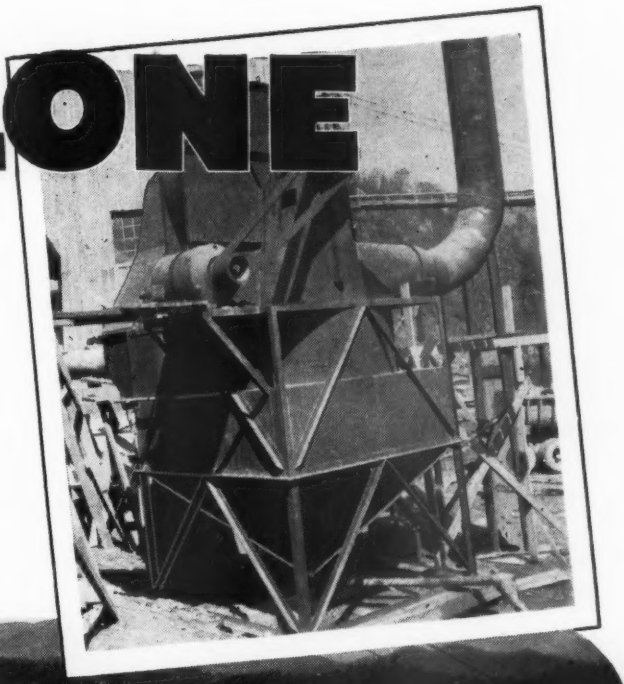
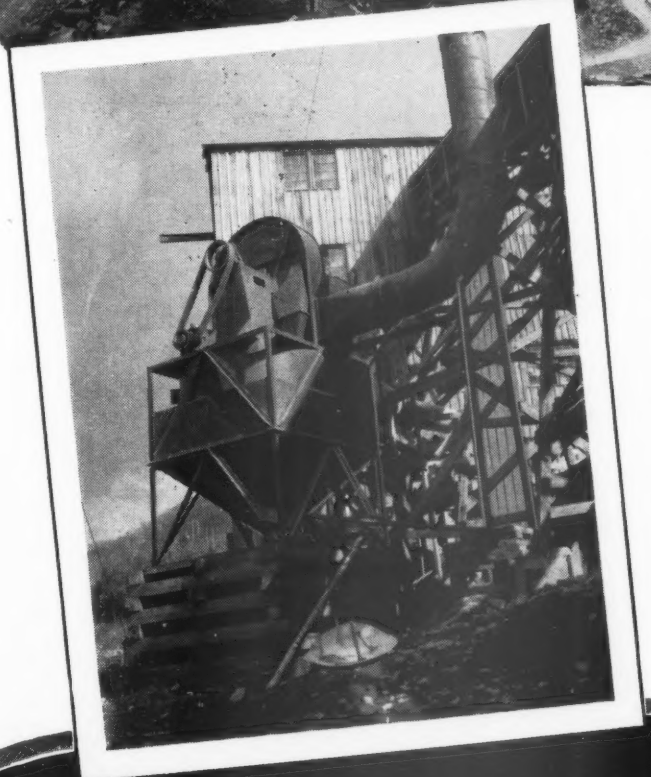
TAYLOR *Spiral* PIPE

ROTO-CLONE

controls rock dust at FONTANA DAM





Effective Dust Control for all rock crushing and screening operations at Fontana Dam is made possible with Type W (Wet Collection) Roto-Clones. Four systems with a total capacity of 63,000 cfm exhaust and collect the dust from primary crushers, cone crushers, screens, and transfer points.

This installation is one of a number of outstanding Roto-Clone Dust Control systems in service in the rock crushing and mining industry. Information on Roto-Clone wet or dry collectors for all types of dust collection problems will be gladly sent on request.

AMERICAN AIR FILTER COMPANY, INC.
Incorporated
192 Central Ave., Louisville, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

PRODUCTION LIKE THIS...
Meets Schedules and Lowers Costs!

5000 TONS PER DAY ON A 7 MONTHS' CONTINUOUS RUN!

Every experienced operator knows that to produce 5000 tons of aggregate every 24 hours—and do it consistently, week after week, month after month—a plant must be perfectly balanced, ruggedly built,—and trouble free. DIAMOND Portable Plants are constantly turning in high-production, non-stop records like this, and have for years. There are mighty good reasons why they do!

There are NO BOTTLENECKS in a DIAMOND Plant

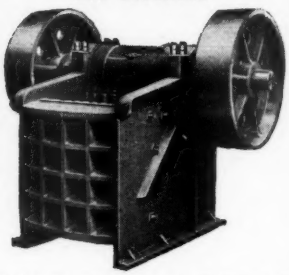
EVERY Unit — jaw crusher, roll crusher, vibrating screen, conveyor — is a PROVEN Unit. The exclusive DIAMOND "ROTOR-LIFT" assures maximum production of each unit and for the plant as a whole. For low-cost, high-output performance that meets or *beats* schedules — investigate DIAMOND. Made in many sizes and types. Ask for new bulletin D-43-G.

DIAMOND IRON WORKS, INC.
ESTABLISHED 1880
AND THE MAHR MANUFACTURING CO. DIVISION
1801 SECOND STREET N., MINNEAPOLIS, MINN.

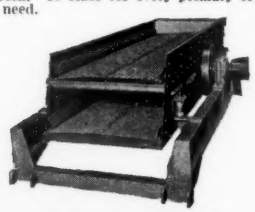
Here Are the Facts:

A DIAMOND No. 95 Plant was used on a big Western ordnance job, producing 2" minus crushed gravel.
Started—May 12th.
Finished—November 6th.
Calendar time—179 days, 24 hours a day 7 days a week—total elapsed time—4,296 hours.
Scheduled operating time—3920 hours.
Actual operating time—3320 hours or **84% of Scheduled Time.**
Aggregate production—463,223 cubic yards. 119 cu. yds. per scheduled hour for entire period. 139 cu. yds. per actual operating hour.

JAW CRUSHERS



DIAMOND was the first maker of jaw crushers to use roller bearings, the long jaw and structural steel base. Greater tonnage per rated capacity. Handles hardest rock. 10 sizes for every primary crushing need.



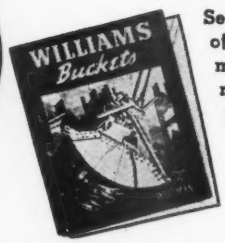
BALANCED VIBRATORS

Accurately balanced—fast, positive separation **all over** screen. No choke—fast delivery. 11 sizes—up to 4 decks.

WILLIAMS *Buckets*

WELDED ROLLED STEEL CONSTRUCTION for LONGER LIFE

MULTIPLE ROPE & POWER ARM TYPES
DRAGLINE • POWER WHEEL • DREDGING
STEEL MILL BUCKETS
⅜ yd. to 16½ yd. capacity



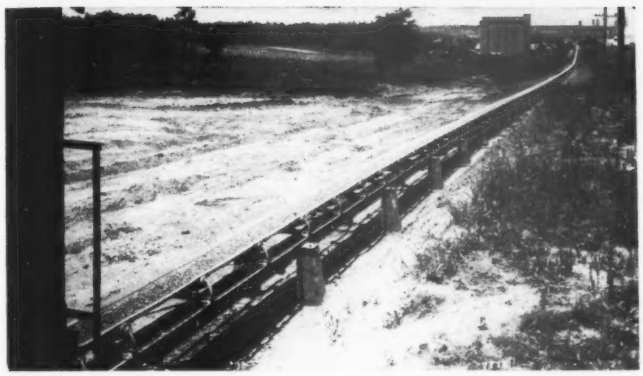
Send for free bulletin covering types of buckets for your particular requirement. It shows details of design and many exclusive features that clearly prove why your next bucket should be a Williams.

ARMY (E) NAVY

THE WELLMAN ENGINEERING CO.
7014 Central Avenue • Cleveland, Ohio

BUILT BY WELLMAN

Another OUTSTANDING JOB by CONTINENTAL

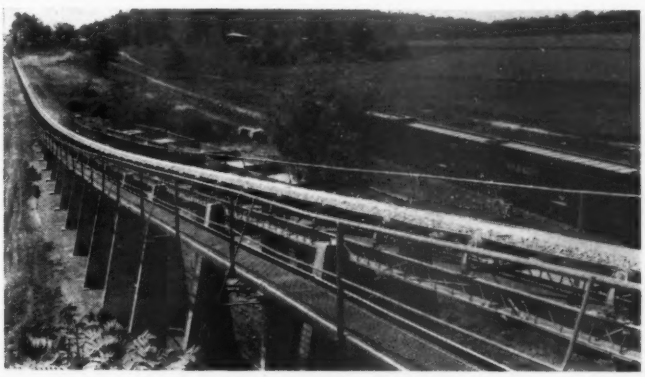


Our Belt Conveyor Engineering Data Book ID-105 is just off the press. Contains complete information on Belt Conveyors. Write for a copy today.

National Cement Company, Ragland, Alabama, opening a new quarry, was confronted with the problem of handling crushed stone one and one-quarter miles from quarry to mill stock pile. After considering all methods of haulage, the management, in conjunction with Continental engineers, designed a Belt Conveyor System giving a cost per ton for handling considerably under any other system considered.

The complete Conveying System is made up of seven Main Conveyors, the overall centers of each based on the topography, but all using the same size motors and drives for interchangeability. Continental equipment is used throughout. The proven low cost (less than 1c per ton) for handling this material has fully justified the management's decision to move their crushed stone via Continental Belt Conveyors.

We are proud of Continental's part in designing this equipment to move stone at a minimum cost per ton, low maintenance and a minimum of labor.



INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

CGC ATLANTA • DALLAS • MEMPHIS CGC

PIT AND QUARRY

Vol. 36 OCTOBER, 1943 No. 4

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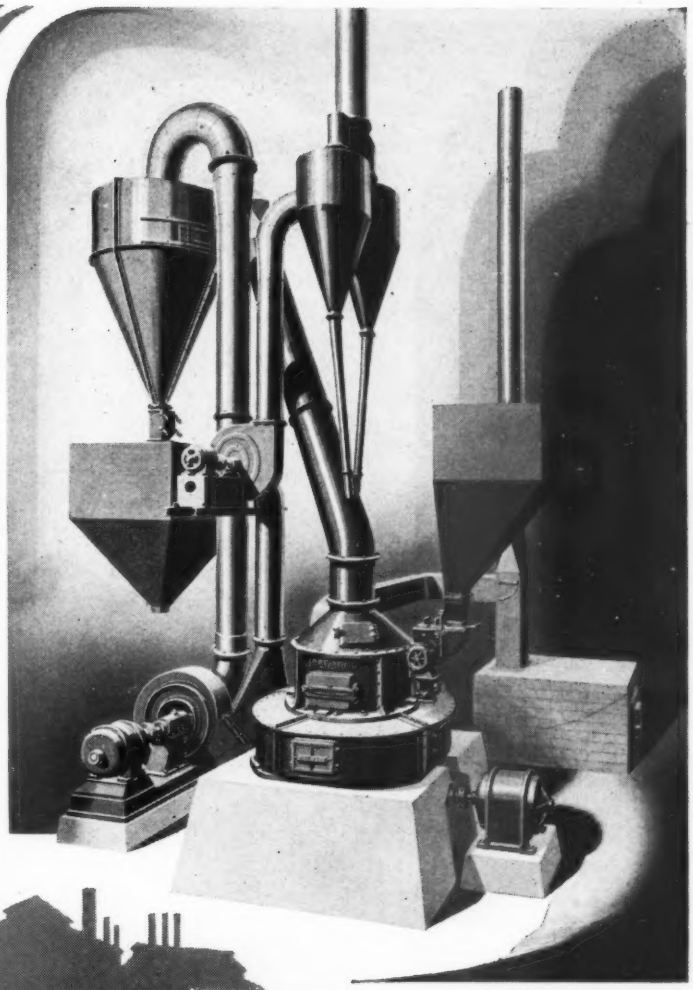
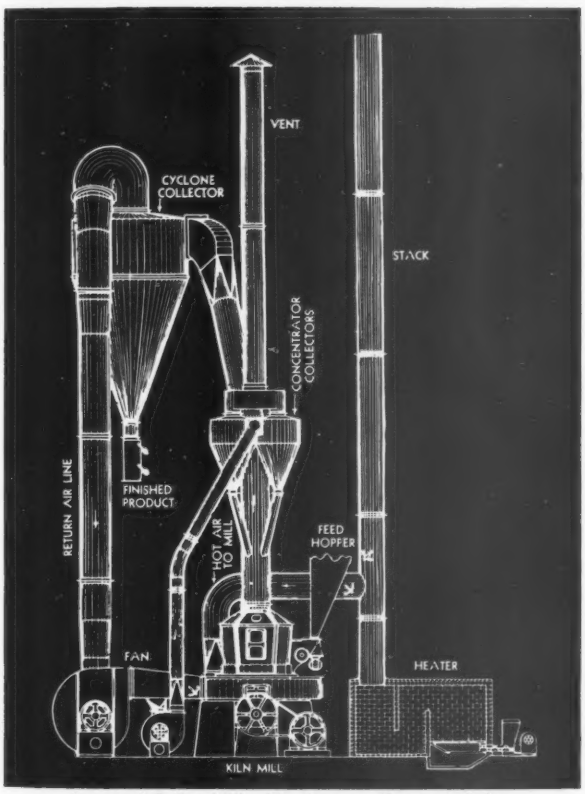
SUPER MILLS

The Answer to Big Production





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EDITORIAL

The "Next" Depression

AN INCREASING number of people are talking more and more about the "next" depression. To thoughtful people the amazing thing about these comments is the degree of certainty with which these persons express themselves on the subject. They are indefinite in their views about the time at which this economic collapse will come, they are generally agreed that it will be worse than the last one, some of them, with sly winks in their eyes, intimate that they have guarded themselves well this time, but that the effects on the others will be horrible. A considerable proportion of these confirmed pessimists are so strong in their declarations about the extent of the coming collapse, that one can hardly keep from wondering whether they may not secretly long for it, believing that it will, in some way which they can not explain, bring about a reign of terror that will culminate in the establishment of a fascistic *régime*.

We strongly believe that much of the confident talk about the coming depression is uttered with a purpose and is innocently repeated by many others who do not suspect any ulterior motive. What that purpose may be varies with the economic, political and even religious statuses of those who hold the views expressed, but the central theme usually appears to be a desire to protect oneself, to safeguard one's own interests, let what may come to the rest.

There are people who see in "the next depression" a means of crippling the labor movement. Their point of interest is economic or, and often also, social. They fear the growing power of labor, especially if, as they believe, it has the active coöperation of government; they fear that, between on the one hand the rising demands of labor for higher wages and on the other side the pressure from consumers for lower, or at least not higher, prices, profits are certain to be greatly reduced, if not, indeed, extinguished. On the social side there is the fear that in that event it will no longer be possible to maintain the social differences, particularly those based on economic power and conspicuous spending, between the people known as profit-takers and those known as wage-earners.

There are others who believe that "the next depression" would bring about the end of democracy—that is to say, majority rule—and result in the establishment of the equivalent of fascism, which in America would more likely than not take the form of an economic aristocracy or plutocracy. Their hatred of government, and more specifically their own government, because of its attempts, however ill-conceived and imperfectly carried out, to keep abreast of public thinking and to spread the benefits of modern technology, is so great that they would risk the dangers of a serious political upheaval if they thought it would end the present "intolerable oppression" of constituted authority.

And there are others, probably the majority of those who speak so glibly of "the next depression," who look upon economic catastrophes much as they would upon a hurricane, not as the results of definite causes which, if not already recognized, could be sought and found and prevented, but as "acts of God," in the face of which man must stand deaf to the pleas of reason and mute for lack of ideas, humbly awaiting the onslaught of financial calamity. This readiness to stand helpless before a problem that is as amenable to solution as any other problem resulting from human action is one of the alarming signs of these times. It is an attitude that is in marked contrast to the self-confident and boastful air with which the same persons proclaim the greatness of the human mind, which has conquered most of the known forces of nature, and of the marvels of the American system, which has brought the bounties of civilization to more people than have enjoyed it in any other land or at any other time.

This strange behavior pattern causes psychologists grave concern, not alone for the persons whose individual troubles grounded in the same spirit of defeatism bring them in for consultation and treatment, but more seriously for the multitude of people who in the same way have failed to learn one of the great lessons of life, namely, that man's attainments as a rational social being are but a fraction of those that he may yet achieve and that no worth-while goals are reached without striving and the assumption of risks. Very like the engineers of whom Henry Ford complained when he was unable to adopt innovations because of their excessive caution and lack of vision, too many of us "know too many reasons why it can't be done." "We have always had depressions," they say—"we" being the American people of the present and past generations and "always" meaning the last 160-odd years—so, naturally, "we must always have them"—"we" being those of the present and coming generations, and "always" meaning for all time to come. That is a sample of the type of "thinking" of which "thoughtful" people speak with "just pride." It is also a specimen of the *laissez-faire* philosophy which has brought civilization, despite its many gains and opportunities, so often to the brink of destruction. The question facing the genuine thinkers of this day is whether we shall continue to be satisfied with a moribund belief and whether we shall continue unwittingly to spread it abroad by thoughtless repetition or silent acquiescence.

THERE will be no "next" depression, if we make plans to prevent it, if we admit to ourselves that it is not an inevitable catastrophe from which there is no escape and recognize it as something resulting from man-made causes that can be man-unmade and not as attributable to sun spots, the visitation of a comet not yet observed, or to the exercise of divine wrath. If we are going to make freedom from want and freedom from economic depressions realities instead of ideals, we must cast off the myths of the nursery and don the confidence and determination of intellectual adulthood.

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★A recent survey among Buell users —companies that have had their Buell Dust Recovery Systems in operation for three, four, five, or more years—brought to light a remarkable record for long life and trouble-free performance, freedom from clogging and absence of repairs.

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Buell Dust Recovery Systems are used for the reclamation of valuable dusts and the abatement of hazardous dust nuisances by leading companies in every branch of industry.

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THE DETROIT EDISON CO.
DEWEY PORTLAND CEMENT CO.
THE DOW CHEMICAL CO.
E. I. DU PONT DE NEMOURS & CO., INC.
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FORD MOTOR COMPANY
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BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

Baker Sees Demand for Million Houses Per Year After War

Melvin H. Baker, president of the National Gypsum Company, Buffalo, told the Sales Executives' Club of New York recently that the nation's accumulated housing needs will bring a postwar demand for more than 1,000,000 new family dwellings for each of the 10 years immediately following peace.

In addition to meeting the demand for new housing, the building industry must prepare for a "great potential market" for replacements, he said, adding that it has been estimated that out of 38,000,000 homes, at least one-third should be demolished and replaced. Clearance of city slums also will create a need for an estimated 4,000,000 homes, he said.

Production capacity of National Gypsum Company plants have been increased 20 per cent. in the last two years and its cash position is the strongest in history, President Baker announced.

Net working capital, he said, has increased $2,330,000 from a year ago to $6,850,000, he reported. Bonded debt has been reduced to $6,200,000 with total annual bond interest and preferred dividends amounting to only $480,000 compared with the 1942 gross operating profit of $3,000,000.

Mr. Baker said that, after the war, the company's various plants would produce as follows: Gypsum, 30 per cent. of the total production; lime, 8 per cent.; insulation board, 10 per cent.; rock wool, 20 per cent.; metal lath, 10 per cent.; casein paint, 10 per cent. and acoustical products, 20 per cent.

One Dead, 2 Hurt in Gravel-Bin Collapse

One man was killed and two others injured on August 28 at St. Paul when a sand-and-gravel bin containing 40 tons of material collapsed and crashed to the ground at the plant of the Cemstone Products Company.

The dead man was Theodore Dehrer, 60. Those injured were Carl Peterson, 45, and John Black, 27.

Helen McNamara Buys Virginia Lime Plant

The plant of the Virginia Lime Products Company at Eagle Rock, Virginia, has been purchased by Miss Helen McNamara and as soon as some necessary machinery can be procured the plant will be put into operation. Miss McNamara is one of the owners and operators of the Eagle Rock Lime Company.

The Virginia Lime Products Company went into the hands of a receiver following labor trouble several years ago and the plant has been idle since. The two lime plants at Eagle Rock provided employment for a large number of persons in that section.

Coming Events

October 5-7, 1943—Chicago. Thirty-second National Safety Congress and Exposition, National Safety Council. Hotel Sherman.

January 25-27, 1944—New York. Annual convention, National Sand & Gravel Association, Hotel New Yorker.

January 26-28, 1944—New York. Annual convention, National Ready Mixed Concrete Association, Hotel New Yorker.

Cloudburst Fills Ohio Quarry with 50 Feet of Water

Production was resumed at the Maple Grove plant of Basic Refractories, Inc., at Tiffin, Ohio, September 7 after a shutdown forced by flooding of the quarry. A cloudburst poured hundreds of tons of water into the pits during the weekend, inundating machinery and stopping production. The crushing plant, 65 feet below the surface, was under nearly 50 feet of water. Tiffin and Bettsville fire pumpers assisted in pumping out the water and hundreds of men were rushed in to recondition water-damaged machines.

Petoskey Closes Plant as Demand Slackens

The Petoskey Portland Cement Company plant at Petoskey, Michigan, has closed for the season. According to John L. A. Galster, president, the plant closed earlier than usual because of the low demand for cement.

Storage silos at Petoskey, as well as at the company's packing-and-storage plants at Chicago, Milwaukee and Detroit are reported filled to capacity.

The company's bulk-cement freighter, *J. B. John,* is tied up at the dock for an indefinite period.

Gets Permit to Build Lime Kiln at Pontiac

Frank Perry of Pontiac, Illinois, has received permission from the War Production Board to build a new lime kiln at the Royal Rock Products Company quarry near Pontiac.

The kiln will produce about 10 tons of lime per day for agricultural, industrial and chemical purposes.

Sheriff Shoots Up Cement Secretary's Car in Wild Chase

Miss Mary Elizabeth Merrill, secretary in the Kansas City office of the Universal Atlas Cement Company, viewed sadly the four bullet holes in her 1941 Chevrolet sedan and its shredded left rear tire which had been stolen and used by a fleeing prisoner from the Kansas City jail.

"Oh, my pretty car," Miss Merrill said, dejectedly, as she examined the vehicle in the sheriff's garage. "Do you think it can be repaired?"

The bullet holes, said J. A. Purdome, chief deputy sheriff, who had fired five shots at the car in a wild 10-mile chase, probably could be welded so they would not be noticeable. The rear glass, shattered by two bullets, could be replaced. But the tire—that was a matter for the rationing board. But the sheriff asserted he would make a report to the board explaining how the damage was caused and do all he could to help her get a new tire and tube.

Paul Rapp, Research Scientist, Dies at 44

Paul Rapp, 44, research scientist for the Public Roads Administration, died at his home in Washington, D. C., recently, following a heart attack.

He joined the organization in 1935 and at the time of his death was engaged as an administrator, supervising chemical investigation of various soil types. He was a project leader on the development of soil-bituminous and other types of stabilizing materials for roads and airport runways.

A native of Lititz, Pennsylvania, he was graduated from Franklin and Marshall College in 1920 and took additional courses at the graduate school of the Bureau of Standards. In 1928 he received his M.S. degree in chemistry at George Washington University. He made a number of chemical and engineering researches into the properties of cement for the Bureau.

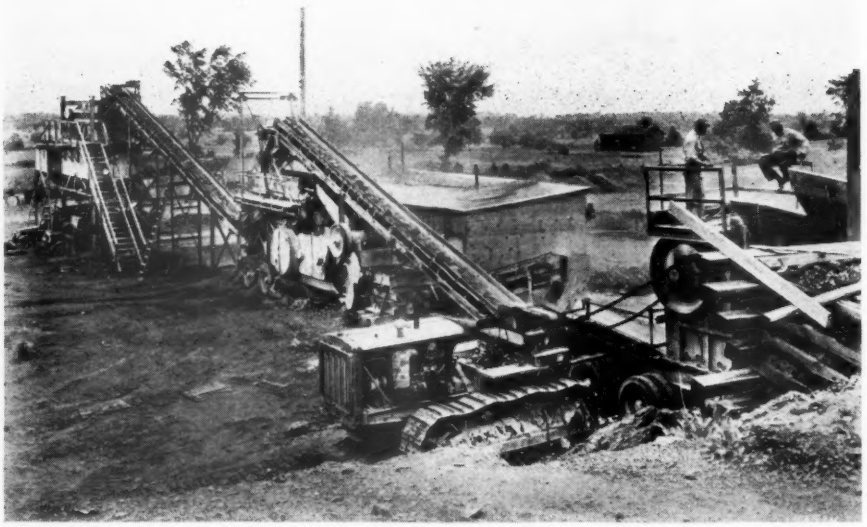
From 1926 to 1932 he was senior research associate for the Atlas Lumnite Cement Company and held a fellowship at the Bureau of Standards investigating the chemical and engineering properties of high alumina cement. In 1932 he became research associate of the Calcium Chloride Association.

Paid Circulation of Pit & Quarry Among Nonmetallic - Mineral Producers In Recent Years:

CONTINUOUSLY FOR 26 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

1942	(November)	6,650
	(May)	6,513
1941	(November	6,179
	(May)	5,945
1940	(November)	5,307
	(May)	5,037
1939	(November)	4,641
	(May)	4,617
1938	(November)	4,496
	(May)	4,366
1937	(November)	3,971
	(May)	3,772
1936	(November)	3,654

82% increase in 6 Years



This Cedar Rapids Morok portable crushing-and-screening plant is producing aggregates on an army cantonment project near Blackstone, Virginia. Power is supplied at the primary crusher by a Caterpillar Diesel D8 tractor. The contractor is the Bero Engineering & Construction Corporation of Buffalo.

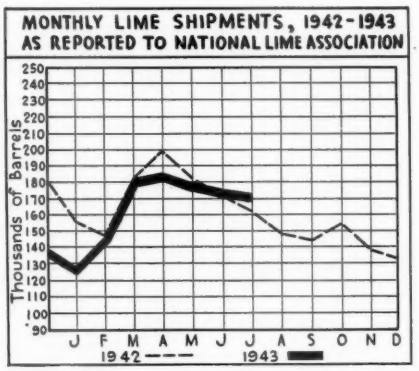
Industrial Hygiene Meeting Nov. 10-11

The eighth anual meeting of Industrial Hygiene Foundation will be held at Mellon Institute, Pittsburgh, on Wednesday and Thursday, November 10 and 11.

The Foundation's board of trustees, meeting in New York on August 25, voted unanimously for the annual meeting as a help in maintaining healthful conditions in war plants, which in turn helps maintain production schedules. Practical, workable measures for the health maintenance of men and plants will comprise the program.

Fischer Residence Near Memphis Sold

The sale of the palatial residence of the late W. W. Fischer, former head of the Fischer Lime & Cement Company at Memphis, Tennessee, located near Shelby Forest in Tennessee, to J. S. Chase, president of the Chase Bottling Company of Memphis, has been announced. The 400 acres of land and the 20-room English Tudor style residence were said to have been disposed of at a price in excess of $100,000. The estate, one of the show places of the South, was developed over a period of years by Mr. Fischer. He brought some of the furnishings from England on trips he made to that country.



According to data collected by the National Lime Association, 63 companies in July, 1942, shipped 167,949 tons of lime (108,411 quicklime; 59,538 hydrate). Reporting companies represent 43.5 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 490,000 tons. Shipments of lime by users for July, 1942, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	507	13,905
Building	9,626	21,083
Chemical	98,278	24,550
Total	108,411	59,538

Misrepresentation of Gravel Deposit Charged in Suit

The Grimmett Construction Company of Oklahoma City, has filed suit in federal court to collect $106,232 damages from Brown & Root, Inc., and W. S. Bellows, Houston contractors, for alleged misrepresentation of sand pits from which the Grimmett company was to produce sand for concrete construction work on the Naval ammunition depot at McAlester, Oklahoma.

The plaintiffs allege that the company was induced to enter a contract for production of 300,000 cubic yards of sand for $1.28 per cubic yard by representations of the defendants; that the pits from which the sand was to be dug were free of bowlders and comparatively lightly covered with overburden.

According to the petition, the plaintiff found this not to be a fact, and so informed the defendants, but was asked to continue the work, nevertheless. The plaintiff company was paid only $42,888. There were so many bowlders and the sand was of such limited quantity, the petition states, that it became necessary for the Grimmett firm to spend $149,121 to get it out.

Fire Destroys Cruiser Owned by Producer

Fire of undetermined origin destroyed the $125,000 cabin cruiser owned by H. H. Holloway, head of the Holloway Gravel Company of Amite, Louisiana, September 7 at New Orleans, while it was moored in Bayou St. John.

The captain, Thomas Alphonso, was alone aboard the cruiser, *Eva,* at the time. He escaped unhurt, but lost all his clothing and a sum of money he had in the cabin. The craft was not insured.

Let Gravel and Pipe Contract at Phoenix

The Arizona Sand & Rock Company of Phoenix, aggregates, ready-mixed concrete, and bituminized-material producer, and the United Concrete Pipe Corporation have been awarded contracts for paving the runways and laying the sewer and drain piping at a huge government flying school in Cochise County, Arizona.

The award was made recently by the U. S. Engineer Office at Phoenix.

SHARE YOUR PIT AND QUARRY

● When you have finished with your copy of Pit and Quarry please pass it to someone else in your organization. By doing so you will not only be helping him by making the information it contains available to him, too, but you will also be helping your government which, because of the shortage of manpower, has been forced to place limitations on the use of paper by magazine publishers. We shall, of course, continue to send Pit and Quarry regularly to you and to all other subscribers. But we suggest this simple method of making Pit and Quarry available to a larger number of men at a time when the information it provides is most urgently needed and without increasing our consumption of paper.

Opens New Quartz Plant in Colorado

The Southern Products & Silica Company of Lilesville, North Carolina, is operating its new quartz mine and grinding plant near Columbus, Colorado.

W. J. Cobb, general superintendent, has returned to Lilesville after getting the new plant into production. Weldon Leyendecker is the local superintendent at Columbus.

Concrete Barges Are Named After Stones

There is something very fitting about the names given to the concrete barges being built at Belair, California, by the Barrett & Hilp Company.

As announced by the Maritime Commission, the first has entered service as the *Agate* and the second is known as the *Chromite. Flint* will be the name of the third, and the others named so far will be *Granite, Graphite, Gypsum, Mica, Onyx, Quartz, Silica* and *Slate.* The remainder of the 26 barges will also be named for varieties of stone.

Rock Dust Use in Coal Mines Grows

An increase in the use of rock dust as a preventive or limiting factor against the destruction of life and property caused by explosions of gas or coaldust in bituminous-coal mines is revealed by reports from mining companies to the Bureau of Mines.

The actual quantity of rock dust applied to underground mine workings has more than doubled since 1930, having increased from 68,500 to 172,000 tons in 1941.

T. A. Hicks Retires as General Chemist of Universal Atlas

Thomas A. Hicks, general chemist of the Universal Atlas Cement Company, retired from active service on August 31.

Mr. Hicks graduated in chemistry from the Case School of Applied Science in 1896. He became chief chemist of the old Art Portland Cement Company at Ransoms, near Sandusky, Ohio, in 1897 and of the

Thomas A. Hicks

Whitehall Portland Cement Company at Cementon, Pennsylvania, in 1900. He joined the Atlas Portland Cement Company as chief chemist at its Northampton, Pennsylvania, plant in 1904, became chief chemist in 1916, and for the Universal Atlas Company in 1930.

Mr. Hicks has participated in the progress and development of the company's plants, including the original operations at some of them and including the prospecting in 1909 at the Hudson, New York, plant where he also installed the first Hudson laboratory at the old mill. Since then, he equipped and assisted in the designing of the modern laboratories built at Waco, Texas; Leeds, Alabama; Hudson, New York; and Northampton, Pennsylvania.

New appointments, effective September 1, have been announced by Blaine S. Smith, president, as follows:

G. L. Lindsay, former engineer of tests, becomes assistant director, tests and research; F. P. Diener, former assistant general chemist, is appointed chemical engineer; and C. L. Davis becomes engineer of tests, having formerly served as assistant to Mr. Lindsay.

Government Fights Inflationary Trend

another P-Q exclusive

THE job of financing the American war effort is a tremendous one from any point of view — economic, political, or any other. One of the least simple of its aspects is the task of selling the American public on the importance of sound fiscal policy in war time. For all its complexity, the problem can be stated in terms understandable to the average citizen, but Treasury efforts to date have notably lacked an aggressive educational program on the elemental facts of war finance.

The primary purpose of the bond drives is anti-inflationary rather than one of underwriting the cost of the war. Yet the appeals used by the Treasury in its war-bond campaigns center around the essentially misleading argument that the production of planes, guns, and ships for our fighting forces depends upon the successful sale of bonds. This argument has validity only in a limited and remote sense, the inroads of inflation adversely affect home front *morale*, which in turn adversely affects production results. The theory adopted by the Treasury evidently assumes that the argument used is justified if it promotes the wholly desirable end of boosting the sales of war bonds.

The simple truth of the matter, as Marriner S. Eccles, chairman of the Federal Reserve Board of Governors, has so forcefully pointed out, is that the money to pay for the war can always be obtained through the medium of borrowing from the commercial banking system of the nation. Such a procedure, however, while providing the necessary funds, would not serve to close the "inflationary gap"—the difference between money in the hands of civilians and the supply of civilian goods available. This gap subjects price ceilings to irresistible pressures, against which government enforcement machinery becomes comparatively ineffective.

Between the years 1939 and 1943 the gross national product, which is the value of all the goods produced and services rendered, will have increased from $90,000,000,000 to about $185,000,000,000, with most of the difference accounted for by government war expenditures.

The national product during the current year will generate a national income, defined as the sum of the distributive shares accruing to the various factors of production, aggregating some $147,000,000,000, with income payments to individuals accounting for $142,000,000,000 of the total. Personal taxes will absorb about $16,000,000,000 of such payments, leaving $126,000,000,000 as the disposable income of individuals after taxes. However, only about $90,000,000,000 in consumer goods and services will be available for consumption in 1943, which will result in an inflationary gap of $36,000,000,000 for the year, the total of individual savings. Last year's savings amounted to $27,000,000,000, two-fifths of which was in the form of currency or bank deposits. If this same ratio holds true for 1943, $24,000,000,000 of the two-year savings total will be in cash.

The Administration's anti-inflation program requires the narrowing of this inflationary gap, largely through the recapture of a considerable part of expanded individual incomes. The most anti-inflationary method of accomplishing this end is through taxation, but under existing tax legislation only a third of this year's government expenditures, or $38,000,000,000, will be raised by taxes. Consequently, the remaining two-thirds, or about $70,000,000,000, must be covered by borrowing from the nation's investors.

These investors may be classed in two principal categories: the first is the commercial-banking system of the country, including the Federal Reserve banks; the second consists of the general public, including individuals, insurance companies, savings banks, business corporations, dealers and brokers, charitable institutions, and some government agencies. The crucial distinction between the two classes is that borrowing from the general public channels to war purposes the money that might otherwise exert an upward pressure on the cost of living, while borrowing from commercial banks results in an immediate expansion of bank credit which is equivalent to increasing the already swollen purchasing power of the nation.

To the extent that taxation falls short of financing the war, and to the extent that borrowing from non-banking sources fails to fill in this deficiency, the government has no choice but to resort to the inflationary procedure of borrowing from commercial banks. Thus, in each of the First and Second War Loans, $5,000,000,000 of bonds went to the banks, and during the first half of 1943 40 per cent. of the increase in the national debt was due to increased holdings of government securities by the commercial and Federal Reserve banks. In an effort to improve this situation, the Treasury decided to limit the $15,000,000,000 Third War Loan drive to non-bank subscribers.

Actually, it is not enough to increase the proportion of government securities taken by all non-banking sources, since the principal inflationary threat arises from the excess purchasing power in the hands of individuals. Only one-fifth of the subscriptions by non-bank investors during the First War Loan were accounted for by individuals and one-fourth during the Second War Loan. Borrowing from such institutions as insurance companies and corporations may reduce the dependence upon bank credit, but does not exert the same anti-inflationary effect as does tapping the current income and savings of individuals. In recognition of this principle, the Treasury has set a goal of $18,000,000,000 to be sold to individuals during the second half of 1943, including the Third War Loan, as against the $7,000,000,000 sold in the first six months of the year.

If this goal is attained, it will mean that over two-thirds of estimated Treasury expenditures will be met through tax receipts and borrowing from individuals, with a substantial part of the remainder covered by loans from other non-bank investors. From an anti-inflation point of view, the fiscal program will at last have become effective.

Cement Manufacturers Attack New Zone-Shipment Order T-1

THE War Production Board, by the issuance August 12 of Schedule 1 as a supplement to General Haulage Conservation Order T-1 as amended August 6, has forbidden, effective September 24, the shipment of cement from cement mills and distributing plants except within certain zones set up in the schedule accompanying the second order. For each of the 167 cement plants or "points of origin" there is designated a zone within which those plants are permitted to ship Types I and II Portland cement. If it is desired to ship these types of cement outside the zone set up for each plant in lots of 20,000 pounds or more, an authorization to do so must be obtained from the WPB. No restrictions are imposed on shipments of Types I and II cement in lots of less than 20,000 pounds, on shipments of Type III Portland, white Portland or other types of cement, on any shipments made entirely by water, or on deliveries of any type in any quantity if the aggregate distance is 50 miles or less.

The letter announcing the restrictions is reproduced herewith and, following it, are General Haulage Conservation Order T-1 as amended August 6 and (in part only) Schedule 1 issued August 25.

WAR PRODUCTION BOARD
WASHINGTON, D. C.
August 28, 1943

To All Cement Manufacturers
Gentlemen:

We are pleased to inclose for your information a copy of the Haulage Conservation Order on Portland Cement, dated August 25, 1943, which has been issued as Schedule 1 to General Haulage Conservation Order T-1 of August 6, 1943. You will note that Schedule I takes effect on September 24.

The Zone within which your firm is permitted to ship Types I and II Portland Cement is described in Appendix A. If you desire to ship these two types outside your Zone in lots of 20,000 pounds or more, whether in bulk or packed, you must obtain an authorization from the War Production Board as provided in Section (b) (2), and the application form, WPB-2188, may be obtained from your nearest local War Production Board office. Such applications for authorization should be addressed to the War Production Board, Washington (25) D. C., and marked: Reference T-1, Portland Cement. So marked your application will be routed first to the Building Materials Division for consideration of the essentiality of the request and from here to the Stockpiling and Transportation Division, who are the administrators of the order.

The order does not cover: (1) *Bona fide* shipments of Type I and Type II Portland cement in lots of less than 20,000 pounds, (2) Shipments of Type III Portland cement, White Portland cement, and other types of cement, (3) Deliveries of any type of cement made entirely by water, (4) Deliveries of any type of cement in lots of any size if the aggregate distance is 50 miles or less.

Very truly yours,
J. L. HAYNES, *Director*
Building Materials Division
CARL F. CLAUSEN, *Acting Chief*
Non-Metallic Section

PART 3157—HAULAGE CONSERVATION
[General Haulage Conservation Order T-1 as Amended August 6, 1943]

The fulfillment of requirements for the defense of the United States has created a shortage in the supply of certain materials and facilities for defense, for private account and for export; and the following order is deemed necessary and appropriate in the public interest and to promote the national defense:

§ 3157.1 *General Haulage Conservation Order T-1*—(a) *Definitions.* For the purpose of this order (and any lists, supplements or schedules hereto, unless otherwise indicated):

(1) "Controlled delivery" means any delivery (including reconsignment) of any material specified on List 1 or 2 annexed hereto, or on any supplement or schedule hereto, where the delivery is to be made under the conditions specified for such material in such list, supplement or schedule.

(2) "Originate" means to load or to tender or offer to a carrier for delivery.

(3) Any distance or mileage which is specified in any list, schedule or supplement to this order, shall be measured over the shortest route over which carload freight may be transported without transfer of lading.

(4) The boundary of any city or village specifically referred to in any list, schedule or supplement hereto, shall be deemed to include the railroad switching limits as established in duly published rail tariffs.

(b) *List 1 Materials.*—(1) No person shall originate a controlled delivery of any List 1 material, except as specifically authorized or directed in writing by the War Production Board.

(2) Any person seeking authorization to originate a controlled delivery of any List 1 material may make application on Form WPB-2188 (Formerly PD-782), or in emergency, by telegram, containing substantially the information called for by such form.

(c) *List 2 Materials.*—(1) Each person shall report on Form WPB-2188 (formerly PD-782) on or before the 20th day of each calendar month all controlled deliveries of List 2 materials which he then intends to originate during the succeeding calendar month.

(2) Each person shall report on Form WPB—2188 (formerly PD-782) on or before the 10th day prior to originating such delivery any controlled delivery of List 2 materials which he then intends to originate and has not previously reported.

(3) Any person may originate a controlled delivery of List 2 materials reported pursuant to paragraph (c) (1) or (2), unless otherwise specifically directed in writing by the War Production Board.

(4) No person shall originate a controlled delivery of List 2 materials which has not been reported pursuant to paragraph (c) (1) or (2), except as specifically directed or authorized in writing by the War Production Board. Application for such authorization may be made on Form WPB—2188 (formerly PD-782), or, in emergency, by telegram containing substantially the information called for by such form.

(d) *Deliveries Originating Outside United States.*—With respect to any delivery terminating within the forty-eight states or the District of Columbia, but in fact originating elsewhere, the delivery shall, for the purpose of this order and any supplements or schedules hereto, be deemed to have been originated by the consignee at the point of entry.

(e) *Materials Covered by Supplements and Schedules.*—The War Production Board may from time to time issue supplements or schedules to this order prescribing conditions governing controlled deliveries of particular materials specified thereon. On and after the effective date of any such supplement or schedule, no person shall make a controlled delivery of any such material except as specified in such supplement or schedule.

(f) *Nonapplicability of Order.*—This order shall not apply to any carrier when acting in the capacity of a carrier, nor shall it operate as an assignment of, or right to obtain, transportation equipment.

(g) *Miscellaneous Provisions*—(1) *Applicability of Regulations.*—This order and all transactions affected hereby are subject to all applicable regulations of the War Production Board, as amended from time to time.

(2) *Applicability of Other Orders.*—Nothing contained in this order shall be construed to limit the requirements of any other War Production Board order now or hereafter issued.

(3) *Appeals.*—Any appeal from denials of applications or from directions pursuant to this order, or any supplement or schedule hereto, shall be made by filing a letter in triplicate, referring to the particular action appealed from and stating fully the grounds of the appeal.

(4) *Violations.*—Any person who wilfully violates any provisions of this order, or any supplement or schedule hereto, or who, in connection therewith wilfully conceals a material fact, or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities assistance.

(5) *Communications to the War Production Board.*—All reports required to be filed hereunder, and all communications concerning this order or any supplement or schedule hereto, shall unless otherwise directed be addressed to: War Production Board, Washington, D. C., Ref.: T-1 (Specify commodity).

PART 3157—HAULAGE CONSERVATION

[Schedule 1 to General Haulage Conservation Order T-1]

PORTLAND CEMENT

In accordance with paragraph (e) of § 3157.1 *General Haulage Conservation Order T-1, It is hereby ordered that:*

§ 3157.2 *Schedule I to General Haulage Conservation Order T-1*—(a) *Definations.* For the purpose of this schedule only:

(1) "Portland cement" means any Portland cement (except white Portland cement) which conforms with one or more of the following specifications:

(i) Federal specifications: Emergency Alternate Federal Specification for cement; Portland E-SS-C-191b, dated June 5, 1942;

(ii) Federal specifications: Emergency Alternate Federal Specification for cement; Portland E-SS-C-206a, dated June 5, 1942;

(iii) American Society for Testing Materials specifications: Emergency Alternate Specification for Portland Cement A. S. T. M. Designation EA-C 150-Type I, dated June 6, 1942;

(iv) American Society for Testing Materials specifications: Emergency Alternate Specification for Portland Cement A. S. T. M. Designation EA-C 150-Type II, dated June 6, 1942.

(2) "Controlled delivery" means any delivery (including reconsignment of Portland cement in lots of 20,000 pounds or more), except

(i) Deliveries originating from any point of origin listed for a particular zone in Column I of Appendix A, annexed hereto, to any point in that Zone as specified in Column 2 thereof.

(ii) Deliveries made entirely by water, or

(iii) Deliveries over an aggregate distance of 50 miles or less. No lot of 20,000 pounds or more shall be subdivided for the purpose of evading this definition.

(b) *Controlled Deliveries.*—(1) On and after September 24, 1943, no person shall originate a controlled delivery of Portland cement, except as specifically directed or authorized in writing by the War Production Board.

(2) Any person seeking authorization to originate a controlled delivery of Portland cement may make application on Form WPB 2188 (PD-782), or, in emergency, by telegram, containing substantially the information called for by such form.

(c) (1) *Controlled Deliveries for Army and Navy.*—Notwithstanding paragraph (b) of this schedule,, any person may originate a controlled delivery of Portland cement to or for the account of the Army or Navy of the United States if he has received from a duly authorized Army or Navy officer a certification in writing in substantially the following form:

The undersigned hereby certifies that it is essential for Portland Cement to be originated by ..... at ..... in the amount of ..... barrels on Contract No. ..... to be delivered at ..... outside of the applicable zone as shown in Schedule 1 to General Haulage Conservation Order T-1. This delivery has been screened in accordance with the existing rules and regulations of the (Army) (Navy) relating to conservation of transportation, and is necessary for the following reasons .....

.....

(Signed) .....
(Title) .....
(Station) .....

Date .....

In case of emergency, deliveries for export may be originated prior to receipt of certification. The duly authorized Army or Navy officer, however, must furnish the above certification within forty-eight hours after the origination.

(2) Any person who has originated a controlled delivery pursuant to a certification received from the Army or the Navy in accordance with paragraph (c) (1) shall report such delivery to the War Production Board on Form WPB 2188 (PD-782) within ten days after such delivery was originated, indicating thereon "This report is being filed pursuant to paragraph (c) (2)".

This order shall become effective September 24, 1943.

NOTE: The reporting requirement of this paragraph and of paragraph (c) (2) has been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

Issued this 25th day of August 1943.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

The complete schedule of "points of origin" and zones appended to Schedule I is too long for reproduction here, but it may be said that of the 167 points of origin—mills and distributing plants—listed therein 65 plants have been assigned individual zones. The others have been placed in groups because of their proximity to one another.

Thus, in New York State, Alsen, Catskill, Cementon and Hudson are assigned a single zone (4), Jamesville and Portland Point are assigned Zone 5 and Buffalo and Lackawanna Zone 7. Glens Falls, Howe's Cave and Oswego are assigned individual zones—2, 3 and 6 respectively.

In Pennsylvania Bath, Brodhead, Cementon, Coplay, Egypt, Evansville, Fogelsville, Hercules, Martin's Creek, Nazareth, Northampton, Ormrod, Sandt's Eddy, Siegfried, Swedeland and West Conshohocken are assigned a single zone (8), Bessemer, Neville Island, Universal, Wampum and West Winfield are assigned Zone 10. To York has been assigned Zone 9.

Martinsburg, West Virginia, and Hagerstown, Security and Union Bridge, Maryland, plants will ship to Zone 11.

In Ohio, Ironton and Superior, along with Kenova, West Virginia, will ship to Zone 21 and Bay Bridge, Silica and Toledo to Zone 23. To Cleveland has been assigned Zone 22 and to Orton Zone 24.

Evansville (Indiana), Kosmosdale (Kentucky) and Cincinnati are grouped for Zone 25.

Among the Michigan plants, Bay City and Saginaw are given Zone 28; Dearborn, Detroit, Fordson, Port Huron and Wyandotte Zone 31; Cement City, Coldwater and Quincy Zone 32.

Cowan, North Chattanooga and Richard City, Tennessee, have been assigned Zone 38.

In Alabama, Birmingham, Bayles, Leeds, North Birmingham, Phoenixville and Ragland will ship to Zone 41.

Chicago, South Chicago and Buffington (Indiana) are assigned Zone 47; LaSalle and Oglesby, Illinois, Zone 49.

In Minnesota, Duluth and Steelton are given Zone 50.

Of the Iowa plants, Davenport and Linwood will ship to Zone 52.

Zone 57 has been assigned to Bonner Springs and Kansas City, Kansas, and Kansas City and Sugar Creek, Missouri. The Alpha, Carondelet, and Prospect Hill plants in Missouri are joined with East St. Louis, Illinois, in the assignment of Zone 58. Cape Girardeau and Marquette, Missouri, will ship to Zone 59.

The plants at Chanute, Fredonia, Humboldt, Independence and Iola, Kansas, and Dewey, Oklahoma, will ship to Zone 60.

In Texas, Dallas, Eagle Ford, Harry's, and North Ft. Worth will ship to Zone 63 and Cementville and Longhorn to Zone 66.

Three of the Washington plants—Irvin, Metalline Falls and Spokane—will ship to Zone 76 and Concrete and Seattle to Zone 78.

In California, Redwood City and San Juan Bautista have been given Zone 87 and Crestmore and Oro Grande Zone 92.

The zones have been laid out to include in some cases single states, groups of entire states or specified counties. Some of the zones overlap other zones.

Cement manufacturers who have invested large sums establishing dealers' relationships now threatened with disruption believe the order may permanently impair their competitive position, even if the Federal Trade Commission's parallel move fails in the courts. Some companies may be forced out of business entirely, it is said.

The opposition of cement manufacturers to T-1 is based on the following charges:

1. The order is discriminatory. Cement, of all commodities shipped in box cars, has been singled out for a highly restrictive zoning system of distribution. Other commodities affected by T-1, such as molasses, liquid caustic soda, corn syrup, and ethyl alcohol, are transported in tank cars. No stringency in the supply of box cars or of bulk-cement cars, comparable to the shortage of tank cars, has thus far appeared. Furthermore, even if such a shortage developed, it would be more logical to conserve transportation equipment, as well as critical manpower, by imposing embargoes on non-essential commodities, than to disrupt the distribution, perhaps perma-

nently, of an essential commodity cement.

2. Cement haulage, as compared with all haulage, represents less than 1 per cent. of the total. The saving of transportation equipment, as a result of T-1, would be an extremely small fraction of 1 per cent. Not only would many shipments for military projects probably receive exemption from the order, owing to the location and urgency of such projects, but an anticipated decline of 40 to 50 per cent. in cement shipments during the next year would greatly curtail the potential savings of freight cars. The average cement haul is less than 175 miles, so that zoning can effect only minor transportation savings. Furthermore, many shipments cover far less than 175 miles, the average being raised by long shipments for military requirements to the fourteen states which do not manufacture cement, or to other states which have only one or two small mills.

3. The immunity granted to producers under TR-2 from antitrust action to arrangements approved by WPB for swapping deliveries and thus saving transportation, would be inapplicable to cement. Whereas in certain chemicals covered by such pooling of orders, all sales are controlled by a small number of producers, whose interests are similar, the cement industry comprises 159 mills, owned by large national distributors as well as by numerous mills with a purely local market. The latter would have everything to gain and nothing to lose by refusing to enter into "swaps" with national distributors.

4. Numerous inequities are established by the zoning system set up by T-1. Arbitrary restrictions imposed by the order would, for example, permit a Birmingham mill to sell in New Orleans but would not allow the latter to sell in Birmingham. Alabama mills may ship into Florida but may not transact business in the less remote state of Georgia. These inequities will result in the loss of markets which producers have spent millions of dollars to develop.

5. The order shows serious defects in its effort to establish an arbitrary mileage limit on shipments without recognizing railway routes and freight-center bottlenecks. Certain zoning restrictions could be explained only if cement were "shipped by airplane and dropped by parachute." In one instance, shipments from Birmingham to Spartanburg, South Carolina, are barred, but shipments to certain localities around Spartanburg are allowed, although these must clear through Spartanburg. To save transportation equipment it is often much more important to avoid bottleneck centers than to reduce ton-mileage through an arbitrary and restrictive order.

6. The order saddles an inefficient mill on the consumers of a particular zone. It also curbs efficient mill operations and the full utilization of manpower by interfering with present smooth scheduling of production.

7. The order fails to give consideration to potential savings of freight by mills which are located close to sources of raw materials, rather than close to consumers and distant from raw materials. Since nearly two pounds of raw materials is needed to make each pound of cement, nearness to raw materials may offset relatively greater distance from markets; yet T-1 will grant a preferred competitive position to many mills which are more distant from their raw materials than other mills which have hitherto served a given area.

The WPB Division of Stock-piling and Transportation has made no attempt to estimate the alleged saving in ton-mileage resulting from T-1. Cement producers are not only convinced that these would be minor, if ascertained, but that the disruptive and restrictive effects on the cement industry would far outweigh any benefits gained.

Fourteen Stone Plants Operate Accident-Free

In coöperation with the National Crushed Stone Association, the Bureau of Mines conducted an accident-prevention contest among companies engaged in the production of crushed stone during 1942, the 17th yearly competition. Fifty-two plants —48 open quarries and 4 underground mines—participated in the contest, all of which were included in the membership of the National Crushed Stone Association. All but four of these plants were also enrolled in the contest of 1941. Operations at the 52 plants during 1942 represented an increase of 1,500,000 man-hours of work over the volume of labor represented by the enrollment of 51 plants in the safety contest of 1941.

The Tomkins Cove quarry of the New York Trap Rock Corporation was the trophy winner in the 1942 contest. This quarry was in operation 192,000 man-hours without a lost-time or disabling injury to any employee throughout the year.

Thirteen plants were awarded honorable mention for operating throughout the year with accident-free records. The plants are as follows:

1. North Branford No. 7 trap-rock quarry, New Haven County, Connecticut, operated by the New Haven Trap Rock Company, worked 135,761 man-hours.

2. Marquette limestone quarry, Cape Girardeau, Missouri, operated by the Marquette Cement Manufacturing Company, worked 106,856 man-hours.

3. Verplanck limestone quarry, Westchester County, New York, operated by the New York Trap Rock Corporation, worked 98,601 man-hours.

4. North American limestone quarry, Martinsburg, West Virginia, operated by the North American Cement Corporation, worked 91,727 man-hours.

5. White Haven sandstone quarry, Luzerne County, Pennsylvania, operated by the General Crushed Stone Company, worked 81,334 man-hours.

6. Union Furnace limestone quarry, Huntingdon County, Pennsylvania, operated by the American Lime & Stone Company, worked 60,263 man-hours.

7. Winchester trap-rock quarry, Middlesex County, Massachusetts, operated by the General Crushed Stone Company, worked 55,085 man-hours.

8. Middlefield No. 1 trap-rock quarry, New Haven County, Connecticut, operated by the New Haven Trap Rock Company, worked 53,360 man-hours.

9. Auburn limestone quarry, Cayuga County, New York, operated by the General Crushed Stone Company, worked 52,363 man-hours.

10. Rocky Hill No. 3 trap-rock quarry, Hartford County, Connecticut, operated by the New Haven Trap Rock Company, worked 44,101 man-hours.

11. Cheshire No. 6 trap-rock quarry, New Haven County, Connecticut, operated by the New Haven Trap Rock Company, worked 27,800 man-hours.

12. North American limestone quarry, Howes Cave, New York, operated by the North American Cement Corporation, worked 26,369 man-hours.

13. Prospect limestone quarry, Oneida County, New York, operated by the L. & M. Stone Company, worked 18,101 man-hours.

Warner Company Takes Over American Lime

The Warner Company, Philadelphia, has entered into a lease agreement covering all of the active operations and business of the American Lime & Stone Company. All American employees have been transferred to the Warner Company payroll.

Operations will be conducted in the Warner Company name as they have been operated under the American name, although some miscellaneous affairs such as rented properties will be retained by the American Company. The operations of the Bellefonte and Union Furnace plants will henceforth be conducted in the name of Warner Company, Bellefonte Division.

Cement-Plant Workers Allowed Pay Increase

The War Labor Board early in September directed the Universal Atlas Cement Company to grant a general wage increase of two cents an hour at its plant in Leeds, Ala. The increase results in a minimum of 75 cents an hour.

the VICTORY *Program*

. . . . . AND YOUR BUSINESS

CEMENT SHIPPING RESTRICTED.— Moving to conserve railroad box-car space, badly needed for the movement of grain and other essential commodities, the War Production Board has extended the controls of General Haulage Conservation T-1 to bulk deliveries of Portland cement.[1]

Schedule 1 to the haulage conservation order, issued August 25, establishes more than 90 zones outside of which Portland cement of given specifications may not be shipped by railway in lots of 20,000 pounds or more, save with prior authority of the War Production Board.

Dr. William Y. Elliott, Director of WPB's Stock-piling and Transportation Division, said that the zones had been so laid out that a purchaser of cement could call on any of several suppliers entitled to ship to him without special authority.

Out-of-zone deliveries for the Army or Navy may be made upon a prescribed certification, signed by a duly authorized officer. All such deliveries, however, must be reported to WPB within ten days of shipment.

No accurate estimate of the number of ton-miles to be saved by the new schedule is available at this time, WPB officials said, but it is known that substantial relief will be afforded railroads by the curtailment of excess and cross hauling of cement.

The shipping restrictions became effective September 24.

CONCRETE INDUSTRY ADVISORY COMMITTEE.— Twenty-one officials of companies engaged in the manufacture of ready-mixed concrete and concrete products were named by the Office of Price Administration on September 4 to serve on an industry advisory committee. The initial meeting of the Industry Advisory Committee for Ready-Mixed Concrete and Concrete Products was held September 15 in Room 2139, Federal Office Building No. 1, Washington, D. C.

The committee is to advise OPA on current pricing problems of the industry existing under Maximum Price Regulation 188 (Manufacturers' Maximum Prices for Specified Building Materials and Consumer Goods Other than Apparel). A discussion as to the feasibility of a separate price regulation or other action patterned to meet the specific requirements of the industry was also to be held.

Those named to the committee are:

L. D. Bailey, president, The Cretox Companies, Elk River, Minn.

Paul P. Bird, president, Boston Sand & Gravel Co., Cambridge, Mass.

H. W. Bush, vice-president, Multiplex Concrete Co., Inc., East Orange, N. J.

E. E. Brainard, treasurer, Lock Joint Pipe Co., Ampere, N. J.

John S. Chase, president, Chase Building Products, Inc., Fort Worth, Tex.

W. E. Corbett, Corbett Concrete Pipe Co., Milford, Mass.

Joseph H. Dixey, vice-president, Transit-Mix Corp., New York City.

Clarence E. Ehle, superintendent, Cleveland Builders' Supply Co., Cleveland.

Herbert O. Jahncke, manager, Jahncke Service, New Orleans.

H. H. Longenecker, president, Penn Building Block Co., Primrose, Pa.

Deane R. Lynde, president, Cinder Concrete Products, Inc., Denver.

Walter Manhardt, president, Best Block Co., Milwaukee.

Roy N. McCandless, president, Cinder Block, Inc., Detroit.

O. H. Miller, president, Choctaw Culvert & Machinery Co., Memphis, Tenn.

J. W. Porter, vice-president, Gifford-Hill Pipe Co., Dallas, Tex.

H. F. Thomson, vice-president, General Material Co., St. Louis.

H. A. Weigand, chief engineer, California Concrete Products Co., San Jose, Cal.

M. L. White, president, Hollestone Co., North Hollywood, Cal.

R. G. Williams, production manager, Maule Industries, Miami, Fla.

G. D. Williamson, president, Valley Concrete Pipe & Products Co., Yuba City, Cal.

L. G. Young, vice-president, George Rackle & Sons Co., Cleveland.

DOUBLE TIME ON SEVENTH DAY.— The Secretary of Labor's last ruling concerning the payment of double time for the seventh consecutive day of work under Executive Order 9240 is controlling for the whole period of the effectiveness of the order and not merely as of the date of its issuance, the National War Labor Board ruled September 4.

The board with labor members dissenting disallowed a claim by the United Rubber Workers of America, CIO, for back pay under Executive Order 9240 for workers at the Akron, Ohio, plant of the Firestone Tire & Rubber Company. The union claimed that the Firestone workers were entitled to back pay for the period from October 1, 1942 to January 26, 1943, representing double time for work on the seventh consecutive day, if that day did not constitute the seventh day in the regularly scheduled work week.

Dean Wayne L. Morse, public member of the WLB, in an opinion on the board's decision, explained that under the first interpretation of Executive Order 9240, issued by the Secretary of Labor on September 25, 1942, "an employee is to be paid double time for work on a seventh consecutive day of work, regardless of whether it constitutes the seventh day in a work week, unless the employer and the employees have arranged a mutually satisfactory work schedule which affords a day of rest in each regular work week."

Under the January 26, 1943, interpretation by Secretary Perkins, employees are not entitled to receive double time for a seventh consecutive day of work unless it in fact constitutes the seventh day in the regular work week, Dean Morse said.

In making its decision, the board accepted the recommendations of the Joint Committee established to make recommendations to the board on all cases involving Executive Order 9240. This committee consists of a representative appointed by the WLB, I. Robert Feinberg, and a representative appointed by the Secretary of Labor, Robert T. Amis, special assistant to the Secretary.

Dean Morse stated that the board accepted the committee's finding that the union's contention, that the second interpretation could not be made retroactive misconstrued the nature of the interpretation.

"The Secretary was required, by the authority assiged to her, to declare what the effect of the order is and was intended to be, and not what it was at any particular date," the committee's report read. "The interpretation constituted merely a step in the administrative process. It did not, and could not alter the order. It is no more retroactive in its operation than a judicial interpretation construing and applying to a statute to a case in hand."

IDLE MACHINERY.— A comprehensive program for the redistribution to essential uses of upwards of an estimated billion dollars worth of used or idle machinery and equipment, much of it now owned by the government, was announced September 16 by the War Production Board.

The huge "brokerage-without-fee" business, organized by WPB's Redistribution Division, is to be a decentralized operation, conducted by the staffs of WPB Regional Offices. An innovation to be introduced by the program will be negotiated sales, under OPA price regulations, of government-owned equipment. Such sales will be made to ultimate users certified by WPB to be eligible to purchase. Sales of government property to dealers will continue to be made on the customary bid basis.

Inventories of more than 55,000 types of machinery and equipment, available for purchase by anyone who qualifies under existing regulations applying to used or idle production equipment, will be filed in WPB Regional Offices. These inventories are being compiled from reports from used-equipment dealers, voluntary listings by user-holders, the War Department, Treasury Procurement Division, Defense Plant Corporation and other government agencies. In all, some ten million pieces are expected to be listed, ranging from WPA sewing machines to industrial boilers and manufacturing equipment rendered idle by program changes.

When applications for authority to purchase new equipment are received by WPB field offices, they will be checked against the inventory lists and the applicant put in touch with the owners of available equipment. When the sales are consummated, following this procedure, they will be the result of negotiation between the buyer and the seller, subject only to OPA ceiling prices. Under recent WPB orders, applications for authority to purchase many types of new equipment must be accompanied by certifications to the effect that no used equipment is available.

READY-MIXED-CONCRETE CONTRACT RENEGOTIATION.— Below is given a copy of a letter written by the National Ready Mixed Concrete Association to the Price Adjustment Boards of the War,

[1] [See pages 49 to 51 of this issue of PIT AND QUARRY for the text of the order.—Ed.]

Navy and Treasury Departments and the Maritime Cosmission, requesting, in behalf of the industry, that ready-mixed concrete be added specifically to the list of products exempted from renegotiation. In April these war agencies issued a Joint Statement outlining their interpretations of the statutory enactments of the Congress which provided for the renegotiation of contractors and subcontractors producing for the war program.

The association has taken the position that this Joint Statement and the list of exempted products appearing at page 13 already reflect an exemption for ready-mixed concrete, but the Price Adjustment Boards are pressing many concrete companies for renegotiation and until ready-mixed concrete is included in the list of exempted products, their status is uncertain.

Although washed and screened sand and gravel are specifically named in the list of exempted products, ready-mixed-concrete companies also producing aggregates are being requested by the Price Adjustment Boards to submit renegotiation data on all phases of their operations. Companies producing sand and gravel exclusively are also being requested to renegotiate. The burden of proving exemption from renegotiation rests on the the company, but in advance of a ruling on ready-mixed concrete it may be stated that no company is under any obligation to submit renegotiation data on washed and screened gravel production, according to the association's executive secretary, V. P. Ahearn. Whenever a company produces this material, the fact should be mentioned in whatever reply is made to the Price Adjustment Board.

Even though members of the ready-mixed-concrete industry may be regarded as subcontractors for the purpose of renegotiation, they are "material men" in respect to the Davis-Bacon Act.

A copy of Mr. Ahearn's letter follows:

NATIONAL READY MIXED CONCRETE ASSOCIATION
Munsey Building, Washington, D. C.

August 30, 1943.

Price Adjustment Boards
War Department
Navy Department
Treasury Department
Maritime Commission

Gentlemen:

In behalf of the commercial ready-mixed-concrete industry of the United States, this association hereby formally requests that the term "ready-mixed concrete" be added to the list of products exempted from renegotiation.

This industry assembles and transports to the point of consumption commodities already specifically excluded from renegotiation—sand and gravel, crushed stone and cement. In many areas of the country we are required to do all the mixing on the site of the work under supervision of representatives of governmental and other purchasers. In other words, our truck reaches the point of consumption with exempted products in an uncombined state. There water is added and mixing action takes place, but the mixing of the exempted products does not reach the first form or state suitable for industrial use until that mixture is introduced into the contractor's forms and there, through chemical action, hardens and serves the industrial purpose.

In other cases, our industry mixes water with the exempted products at a central mixing point and transports the exempted products thus mixed in a truck to the point of consumption, agitation taking place *en route*. In still other cases, the exempted products are introduced into the truck-mixer at a central proportioning plant, mixing occurring *en route* to the job and at the point of the job.

..It is perfectly obvious that ready-mixed concrete is only another term for the simple mixture of commodities now formally recognized as exempted products. It is equally obvious that our industry does not process, refine or treat these exempted products beyond the first form or state suitable for industrial use, and that therefore "ready-mixed concrete" is really already on the list of exempted products because our principal function is one of transportation of these exempted products to the actual point of use.

A study of the Joint Statement on Renegotiation issued by the War, Navy and Treasury Departments and the Maritime Commission on March 31, 1943, will disclose that ready-mixed concrete is well beyond the type of commodity at which renegotiation is aimed. This industry handles a standard, commercial product. The state of war has not affected the natural operation of the industry. In most cases we have functioned from permanent locations, and in other cases we have installed special operations on the site of essential projects, the operation being dismantled and removed when the project is completed. Generally we have used our own facilities and capital.

While we are controlled by the General Maximum Price Regulation of the Office of Price Administration, the public has had a much more certain protection against unreasonable and excessive prices for ready-mixed concrete than either OPA ceiling prices or renegotiation could furnish. We are really competing with our customers, who are perfectly able in nearly every case to mix the aggregates and cement on the site of the work, using their own equipment. If our price does not match closely the contractor's estimate of his own costs for the combination of the exempted products, our industry does not get the business. There can never be a charge for ready-mixed concrete which is not justified by the bare cost of doing business.

With the exception of special installations on the site of projects, our industry has been selling its product for war requirements, for indirect war requirements not covered by renegotiation, for industrial purposes which haven't made our operations subject to renegotiation, and for the requirement of state, county and city agencies. If is utterly impossible under these circumstances for us to furnish the elaborate data which the renegotiation authorities have requested, because of the physical impossibility of making the necessary segregations. Generally the clerical and accounting staffs of our companies consist of only a very few people. The many demands of war agencies for the compilation and presentation of data have produced an acute crisis in this business, and we face a serious obstacle when we undertake, with any degree of precision, to furnish the data which renegotiation calls for.

Ours is not a case of the production of a war material. This industry did not change its method of doing business from normal times. Competition has remained keen and vigorous, and neither the public nor the United States Government needs special price controls or renegotiation in order to prevent excess profits.

It is observed in the Joint Statement that the war agencies proceed under renegotiation whenever it is believed that excessive profits have been realized on or are likely to be realized. Even a limited investigation of this industry will remove any possible doubt regarding the validity of the statement now made that the ready-mixed-concrete industry has not made, nor can it possibly make, the kind of profits for which renegotiation was provided by the Congress.

In view of these facts, it is respectfully requested that the membership of the ready-mixed-concrete industry be relieved from renegotiation, either by interpretation of the Joint Statement or by the term "ready-mixed concrete" being specifically added to the list of exempted products.

Sincerely yours,
V. P. AHEARN,
Executive Secretary.

REPAIRS OF PLANT MACHINERY.— Blanket preference ratings assigned for MRO purposes may be applied by persons eligible to use them for the repair of plant machinery and equipment, even if the repair job does not involve the delivery of repair parts or materials, the War Production Board ruled through issuance of Priorities Regulation 3, as amended August 10.

Blanket MRO ratings are assigned by CMP Regulations 5 and 5A, certain orders in the "P" series, and certain other WPB orders and regulations and on forms and certificates where the kind and quantity of this material to which the rating may be applied is not specified. In any case where the quantity of material is specified in terms of dollar value only the preference rating is a blanket MRO rating.

Ratings assigned on PD-1A and PD-3A certificates and other ratings assigned to the delivery of specific repair parts or materials may also be applied to the installation of the parts or materials or to the repair job alone if it is found that installing the parts and materials is not necessary. However, in the case of ordinary plumbing, heating, electrical, automotive, or refrigeration repairs, a rating may not be applied to repair work even if it is expressly applicable to repair parts or materials.

For the purpose of this part of the order, repair means to fix a plant, machinery, or equipment after it has broken down or when it is about to break down. It does not include upkeep or maintenance service such as periodic inspection, cleaning, painting, lubricating and other services.

Ratings for repairs, as distinct from the delivery of repair parts or materials, may be applied only to persons regularly engaged in the business of making such repairs with their own tools and equipment.

Persons who have received a preference rating for the use of facilities only or for a repair job only, where no delivery of materials is involved, may not extend the rating for any purpose.

The regulation also provides that blanket MRO ratings may not be applied to get any item included in List B of the regulation. Suppliers are prohibited from giving any effect to ratings applied to deliveries of any item on List B if they know or have reason to believe that it is a blanket MRO rating. Ratings which are not blanket ratings may, however, be used to obtain List B items.

The item on List B which covers laboratory instruments and equipment has been amended to permit the use of ratings assigned pursuant to Orders P-56, P-58, and P-73, relative to the mining industry.

At the same time preference ratings assigned for maintenance, repair and operating supplies may be used to obtain fire hydrants, as a result of the amendment which deletes such hydrants from List B. The amendment also deletes List C from the regulation.

However, the use of preference ratings for the items which were on List C is still restricted by certain orders—for instance, textile items subject to M-328 and the container items subject to P-140.

TRUCK REPAIR PARTS.— Truck owners and operators will receive increased help in finding needed repair parts during the coming months through the efforts of the Maintenance Specialists in the 142 district offices of the Office of Defense Transportation, ODT announced September 12.

In addition to spreading the greatly expanded flow of new parts scheduled for production, the Maintenance Specialists have access to the lists of interchangeable parts used in many types of trucks and will undertake to locate needed parts through ODT Maintenance Specialists in other cities, through parts makers and through the coöperation of the War Production Board, as well as through the local channels afforded by the industry-wide membership of local District Maintenance Advisory Committee and sub-committees.

Through the coöperation of members of the local committees over half of the local parts shortages reported to the ODT to date have been relieved locally. Through the 142 ODT District Maintenance Specialists the local search is put on a nationwide basis.

A general view of Fontana Dam under construction. Concrete plant and cement-storage tanks are at left. The concrete conveyors to the dam are also shown.

BRIDGE CONVEYORS TAKE FONTANA DAM AGGREGATE ACROSS RIVER TO SIZING PLANT AND BACK TO CONCRETE PLANT

another ON THE SPOT report

THE Tennessee Valley Authority in building a total of 16 dams along the Tennessee River and its tributaries during the past ten years has designed and operated a number of outstanding aggregates plants. Some of these have contributed much to the technology of the industry and the detailed records kept have thrown considerable light on the costs of various operations and the efficiencies of various types of equipment. For example the plant at Norris Dam, the first in this series, which was described in the September, 1934 issue of PIT AND QUARRY, was one of the first plants to produce stone sand successfully on a large scale.

The Authority's latest crushed stone plant at Fontana Dam incorporates the earlier plants and a number of new ideas. Its rated capacity of 800 tons per hour also makes it the largest of the T.V.A. plants and one of the largest crushed-stone plants in existence. This figure includes four sizes of crushed stone from 6 inches down and 250 tons per hour of stone sand.

Unusual Features A conspicuous feature is the use of a surge stock pile between the primary crushers and the remainder of the plant. This provides more than enough live storage to operate the plant for one 8-hour shift.

Another feature is the exclusive use of belt-conveyors for moving the aggregates from the quarry to the mixing plant and the concrete thence to the point of pour. The entire belt-conveyor system is over two miles in length.

From the primary crushers on through to the rinsing screens all the

By W. E. TRAUFFER

equipment except the conveyors is in duplicate so that a breakdown can stop only half the plant.

The unusual layout of the plant, with the crushing and screening plant on the opposite side of the river from the quarry and the central concrete-mixing plant, was necessary, because the sheer cliffs rising up from the north or quarry side precluded the possibility of building the main plant there. Even so the rugged topography on the south side of the river made it necessary to do some digging and filling to provide sufficient flat area and the screening and storage department had to be separated from the remainder of the plant.

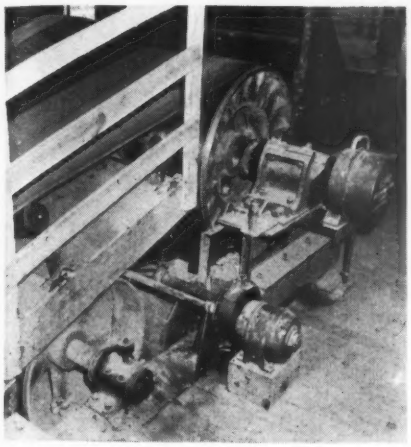
One of the four 3-cubic yard electric shovels loading truck in quarry.

The plant was designed under the direction of R. T. Colburn, T.V.A. construction plant engineer. He was assisted by R. E. Martin, job engineer; T. S. Whitehouse, electrical engineer; D. W. Yambert, mechanical engineer, and A. F. Hedman, structural engineer. Fred Schlemmer is project manager, succeeding C. E. Blee who is now chief engineer. G. E. Murphey is construction superintendent and Oren Reed is construction engineer. Frank Cadena is plant foreman, and W. R. Johnson is concrete technician.

The Dam The Fontana Dam, which is on the Little Tennessee River, a tributary of the Tennessee River, about 40 air-miles southeast of Knoxville and just across the border in North Carolina, will be by far the largest of those built by the T.V.A., its 2,800,000 cubic yards of concrete being nearly three times the volume of that required for Norris Dam. It will also be the largest concrete dam east of the Mississippi River. Its height of 460 feet will be greater than that of Grand Coulee Dam and is ex-

ceeded only by those of the Boulder and Shasta Dams. At its base Fontana Dam will be 375 feet thick, and it will have a 20-foot roadway at the top. The stream's flow will pass the completed dam via a spillway at one side and through two diversion tunnels when not required to generate power. These tunnels are now being used to divert the entire river flow, making possible one-stage dry construction of the dam.

Fontana Dam will probably be the last T.V.A. dam to be built for

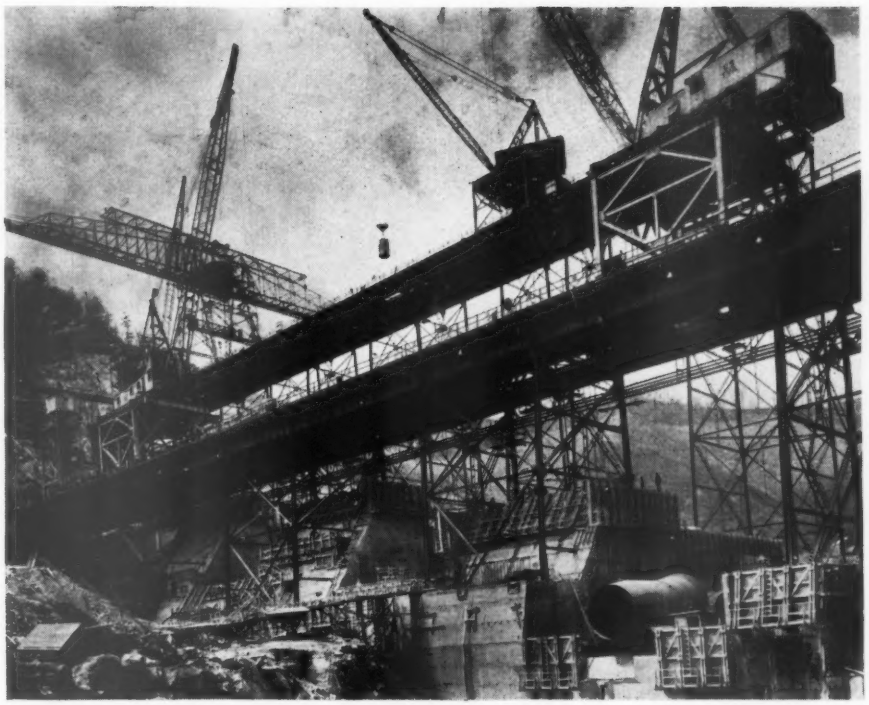


Magnetic pulley on conveyor to scalping screens over secondary crushers.

the duration of the war, although several more dams are to be built later to complete the T.V.A. program. It is a strategic dam as it is located above two dams of the Aluminum Company of America and above all but one of the nine main river dams of the Authority. Its construction will insure realization of the full benefits of its great storage capacity at all the dams below. It will provide approximately 1,500,000 acre-feet of flood storage and will add approximately 200,000 kilowatts of installed capacity to the T.V.A. system.

Through an agreement between the T.V.A. and the Aluminum Company the operation of Fontana Dam and the T.V.A. system will be integrated with the Aluminum Company's dam system on the Little Tennessee River watershed. The T.V.A. will direct and control the operation of these dams in such a way as to obtain the maximum public usefulness of the water in this entire watershed.

The location of this dam far from any commercial source of aggregates left no alternative to the production of these materials as close as possible to the dam site. Sand and gravel could not be used as no suitable deposits were found closer than the Tennessee River, and the shipment of several hundred carloads daily



Close-up view of construction operations on the dam with some of the concrete-storage tanks at far ends of trestles.

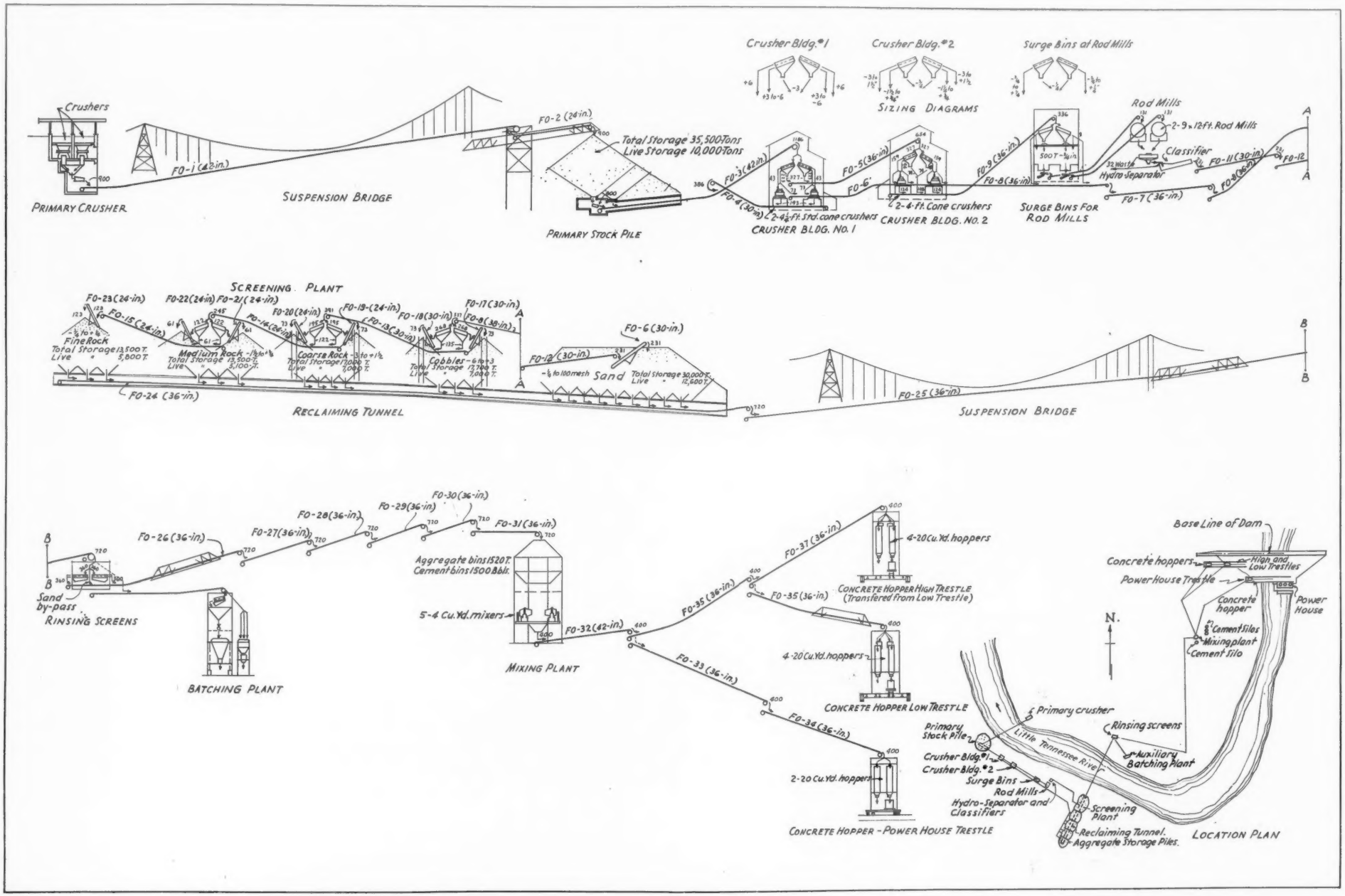
over 50 miles of mountainous country was out of the question. Several prospective quarry sites were explored and the best one, 4,000 feet downstream from the dam site, was selected.

Deposit The deposit is a micaceous quartzite which meets all the specifications for a concrete aggregate. It is in a faulted area and much of it is conglomeratic and massively bedded. The deposit dips 57 degrees southeast. The stone is light to dark gray in color, has a silica content of 68 to 80 per cent. and is very abrasive. It has a Los Angeles rattler index hardness of 9, a specific gravity of 2.67 to 2.77, and an average compressive strength of 23,000 p.s.i.

There is considerable overburden which was removed by hydraulicking and by shovels.

Drilling and Loading The drilling of the 150- to 200-foot face is being done with six Bucyrus-Armstrong 29T electric crawler blast-hole drills, with 9-inch bits. Approximately a 30-foot burden is being obtained with holes drilled

A general view in the quarry showing several of the shovels and trucks in use.



Flow sheet of plant from primary crusher through preparation plant and concrete-mixing plant to hoppers at dam site. A location plan of sand flow is at lower right.

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Flow sheet of plant from primary crusher through preparation plant and concrete-mixing plant to hoppers at dam site. A location plan of sand flow is at lower right.

Suspension-bridge conveyor which carries aggregates from screening plant and storage across river to concrete plant.

at 25-foot centers, Du Point Nitramon explosive is used. The yield is about 3 tons of rock per pound of explosives.

The stone is loaded at the face by two Marion 4121 and two Bucyrus-Erie 100B electric crawler shovels with 3-cubic yard dippers and Ward-Leonard controls. A fleet of 10 Euclid trucks with 13-cubic yard end-dump bodies is used to haul the stone to the primary-crusher station, an

Electric-vibrating feeder handling stone from stock pile following primary crushers.

average distance at present of about 500 feet. Several 12-cubic yard Mack trucks are also used.

Primary Crushing The two Allis-Chalmers Superior McCully 42-inch primary gyratory crushers are located side by side on the bank of the river at the edge of the quarry with their tops slightly below the quarry level. Over each crusher is a steel frame-work from which is suspended a stone hook operated by an electric hoist.

These crushers are set to reduce the stone to 4½-inch size and under and they discharge into a common hopper. Under the hopper is a 60- by 108-inch Jeffrey-Traylor electric vibratory feeder with a rated capacity of 1,500 tons per hour. This discharges the stone on a 42-inch by 610-foot belt-conveyor (FO-1 in the accompanying drawings), which is carried across the river on a cable suspension bridge that has a span of 454 feet between its towers. This bridge was used at the Watts Bar Dam for the same purpose. The stone is discharged from this conveyor on a 42-inch by 59-foot inclined belt-conveyor (FO-2), which is supported on a rigid truss framework with a 58-foot cantilever at the discharge end. The stone is discharged at a height of 75 feet above the ground level on a stock pile. This has a capacity of 35,000 tons of which about 10,000 tons represents the live storage of material reclaimable on a tunnel belt-conveyor (FO-3) under the pile.

In the top of the tunnel is a single opening which is equipped with a 48- by 96-inch Jeffrey-Traylor vibrating feeder having a rated capacity of 875 tons per hour. An emergency opening fitted with a gate is also provided for use in case the feeder should be shut down for repairs. Conveyor FO-3 is 42 inches wide, is set on 303-foot centers and carries the stone to the top of crusher building Number 1, which houses the primary scalping screens and the secondary crushers. This conveyor has a 48-inch diameter by 45-inch Dings 125-volt high-intensity magnetic head pulley which removes tramp iron.

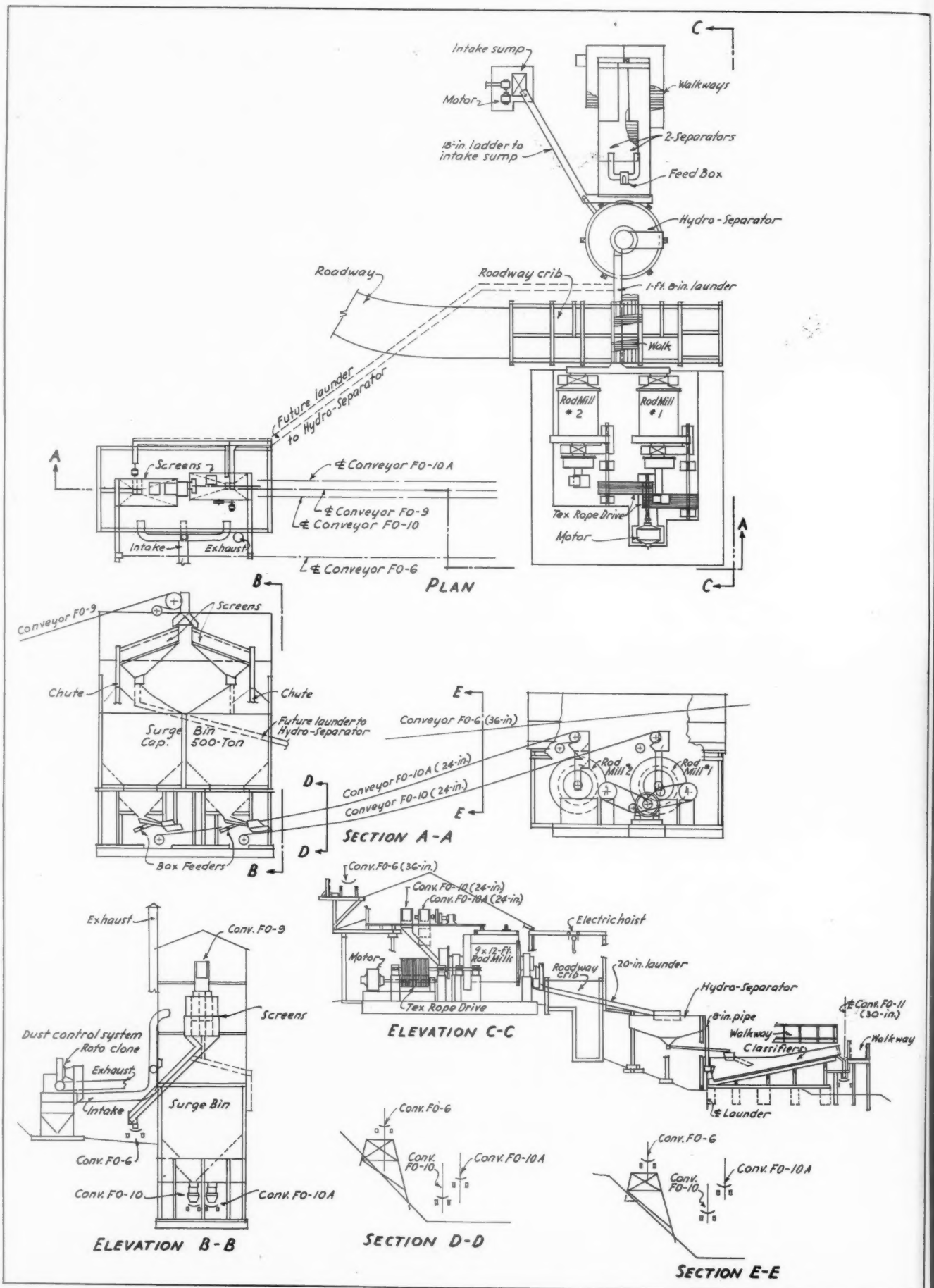
One of the screens scalping oversize to tertiary crushers.

Primary Screening A selective gate controls the discharge of the stone from this conveyor into either one of, or both, the two Tyler F600 Ty-Rock 5- by 12-foot double-deck screens. These have 6- by 7½-inch top and 3¼-

Main belt-conveyor joint ready to be vulcanized.

inch bottom openings. The oversize from their top decks drops into two 4¼-foot Symons standard cone crushers which make a minus-1¾-inch product. The material off the bottom deck of these screens can all be discharged through a stone ladder on the storage belt-conveyor (FO-6) or all or any part of it can also be diverted to these crushers. The product of these crushers is returned on a 30-inch by 207-foot belt-conveyor (FO-4) to the tunnel conveyor (FO-3) for rescreening.

Secondary Crushing The material falling through the bottom decks of these screens is carried on a 36-inch by 204-foot belt-conveyor (FO-5) to crusher building Number 2. This material can be split as desired to another pair of Tyler F600 Ty-Rock 5- by 12-foot two-deck screens. These have 1⅝-inch and ⅞-inch openings on their top and bottom decks, respectively. All or any part of the material passing over both decks of these screens can be discharged into two Symons 4-foot short head cone

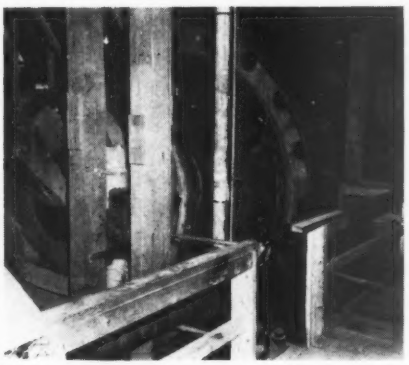


Plan, section and elevations of stone-sand department.

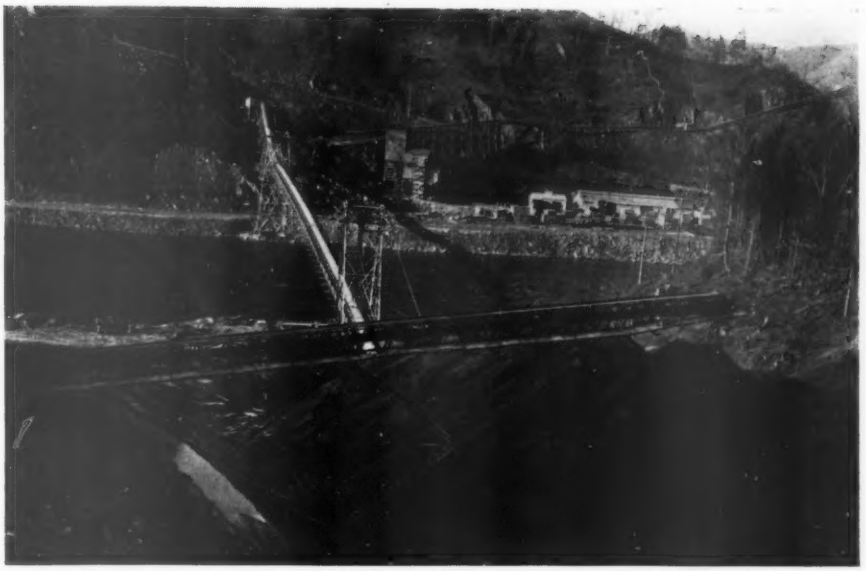
crushers for further reduction to ¾-inch size and under or it can be dropped through a stone ladder on the storage conveyor (FO-6).

The crusher product and the material falling through the bottom decks of these screens are carried on a 30-inch by 384-foot belt-conveyor (FO-9) to the rod-mill or stone-sand surge building. There this material is split to a pair of Allis-Chalmers 6- by 12-foot Ripl-Flo single-deck screens with ⅜- by ¾-inch openings. Any desired percentage of the material passing over the top decks of these screens can be diverted to the storage conveyor (FO-6).

Stone-Sand Milling The material passing through these screens and any desired part of that passing over them drops into two surge bins with a combined live-storage capacity of 500 tons. Under these bins are two Syntron Model F4 electric vibrating feeders each of which has a rated maximum capacity of 150 tons per hour. These machines feed the material from the bins at any desired rate to two 24-inch by 95-foot belt-conveyors (FO-10A and FO-10) which carry it to the two Allis-Chalmers 9- by 12-foot rod-mills. This bin-and-feeder arrangement insures the steady rod-mill feed necessary for the production of specification sand.



One of the two stone-sand grinding mills.



Sand-stock-piling conveyor and storage with bridge conveyor across river and blast-sand plant on opposite side.

These mills are driven through V-belts by a single 800-horsepower G-E 443-r.p.m. wound-rotor motor which has a clutch that makes it possible to run both mills simultaneously or either one alone. Each of the mills is loaded with 70,000 pounds of 2½-, 3-, and 3½-inch rods but the load can be varied depending on the fineness of product desired. Each mill has been grinding about 120 tons per hour under existing conditions, including 25 tons per hour of waste, but outputs up to 160 tons per hour have been obtained. The feed to the mills is approximately minus-1½-inch material with 57.2, 22.6, 15.7, 10.9, and 7.4 per cent. passing through the 4-, 28-, 48-, 100-, and 200-mesh screens, respectively. The resulting slurry is all minus 1-¼-inch with 46.8, 33.7, 25.4, and 18.6 per cent. passing through the 28-, 48-, 100- and 200-mesh screens, respectively. The rod wear under these conditions has been 0.7 pound per ton of sand produced. Some of the fine (—¼-mesh) material from the screening operation at the rod-mill surge bin now by-passes the rod-mills, being flumed direct to the bowl hydroseparator. At this time more rods (about 15,000 pounds) are added to each mill to grind finer sand to assure a correct analysis as this is blended with the fines that are by-passed.

The 1500-t.p.h. electric vibrating feeder under the two primary crushers.

Sand Classifying The slurry from both mills is flumed to a 16-foot diameter by 5-foot deep Dorr hydroseparator from which a portion of the minus-100-mesh material overflows and is wasted. The material settled out is split to a pair of 30-foot Dorr rake classifiers one of which is 5 feet and the other 7 feet wide. More minus-100-mesh material is removed by these classifiers which also dewater the finished sand. This sand contains from 10 to 12 per cent. of minus-100-mesh material which is

View from edge of quarry at plant with bridge conveyor and stock pile in foreground.

necessary for proper workability and maximum cement yield. Extensive tests were made with the rod loads, classifier overflows, rate of feed, etc., in order to obtain the desired fineness at the highest possible capacity.

The finished sand, containing about 18 per cent. moisture, is carried on 30-inch by 337-foot inclined belt-conveyor FO-11 to 30-inch by 124-foot belt-conveyor FO-12. The latter in turn discharges the sand on 30-inch by 110-foot radial stacker conveyor FO-16 which swings in a 50-degree arc to discharge the sand into a stock pile over one end of the finished material reclaiming tunnel.

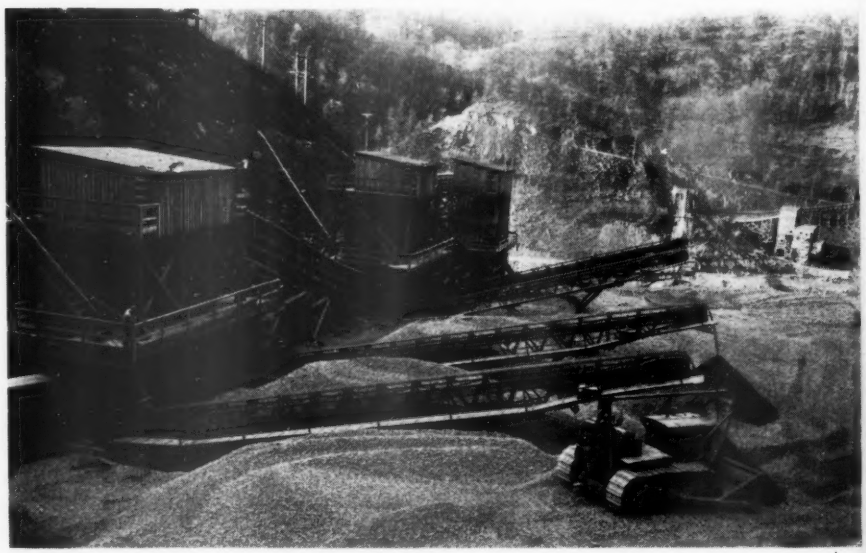
One primary crusher with truck discharging to the other.

Stone Sizing The storage conveyor (FO-6), which receives the various finished sizes of crushed stone, is 36-inches wide and 725 feet long. It is followed by two 36-inch conveyors (FO-7 and FO-8), which are respectively 253 feet and 184 feet long. The latter conveyor carries the stone to the final screening plant, where the final size separations are made. All the finished products are stored in stock piles over the reclaiming tunnel already mentioned. The stone is first split to a pair of Tyler F600 Ty-Rock 5- by 10-foot single-deck screens equipped with 3¼-inch wire cloth. The 6- to 3-inch rock passing over these screens is known as cobbles and is discharged to stock piles by two 30- by 78-foot fixed boom belt-conveyors (FO-17 and FO-18).

The minus-3-inch stone passing through these screens is carried on a 30-inch by 121-foot belt-conveyor (FO-13) to a pair of 5- by 14-foot Allis-Chalmers Ripl-Flo single-deck screens with 1⅝-inch openings. The 3- to 1½-inch material passing over these screens is discharged on stock piles by two 24-inch by 78-foot fixed boom belt-conveyors (FO-19 and FO-20). The minus-1½-inch material passing through these screens is carried on a 24-inch by 124-foot belt-conveyor (FO-14) to a final pair of 5- by 14-foot Ripl-Flo screens. These have ⅞-inch openings. Their 1½- to ¾-inch oversize is discharged to stock piles by two 24-inch by 78-foot fixed boom belt-conveyors (FO-21 and FO-22). The ¼- to ¾-inch throughs from these screens are carried on a 24-inch by 118-foot conveyor (FO-15) to a final 24-inch by 78-foot boom belt-conveyor (FO-23), which discharges this material on a stock pile at the opposite end of the tunnel from that at which the stone sand is stored.

Storage The sand stock pile has a total capacity of 30,000 tons of which 12,600 tons is live storage. The figures for cobbles and coarse rock are 17,000 tons total storage and 7,000 tons live storage. The medium and fine rock capacities are 13,500 tons total and 5,800 tons live storage.

The 700-foot long reclaiming tunnel under these finished-material stock piles is of laminated-timber construction. In the top of this tunnel are manually-controlled arc-type lever-operated gates through which these fine materials are fed one at a time to a 36-inch by 696-foot belt-conveyor (FO-24). The normal reclaiming capacity is 800 tons per hour, but this can be exceeded as the conveyor system is designed to handle a 25 per cent. overload. From this conveyor the aggregate is discharged on the first of a series of seven 36-inch belt-conveyors running to the concrete central-mixing plant on the opposite side of the river near the dam site.



Stacker conveyors building up storage piles over reclaiming-conveyor tunnel.

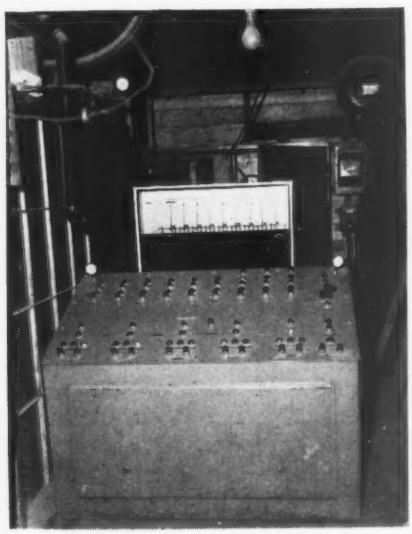
Another view of the trucks dumping into the primary crushers.

Transportation to Concrete Plant The first conveyor in this series, FO-25, is 755 feet long and carries the material back across the river over another 425-foot span section of the Watts Bar

Hydroseparator and rake classifiers which discharge finished stone sand on storage conveyor in background.

suspension bridge to a rinsing station. There the material is split to a pair of Nordberg Symons F 5- by 14-foot two-deck screens with 1-inch top-deck and ⅛- by ⅜-inch bottom-deck openings. These screens are equipped with sprays and are used to remove fines from all the materials except the stone sand.

The sand is by-passed direct to the second conveyor (FO-26) and other sizes can also be by-passed if desired. The second, third, fourth, fifth, sixth and seventh belt-conveyors (FO-26 to FO-31, inclusive) are



Electric control board in central concrete-mixing plant.

respectively 681, 290, 480, 350, 624, and 147 feet long. They carry these materials along the rugged hillside upstream to the mixing plant, raising them from an elevation of 1,350 feet at the first conveyor (FO-25) to an elevation of 1,650 feet at the top of the mixing plant.

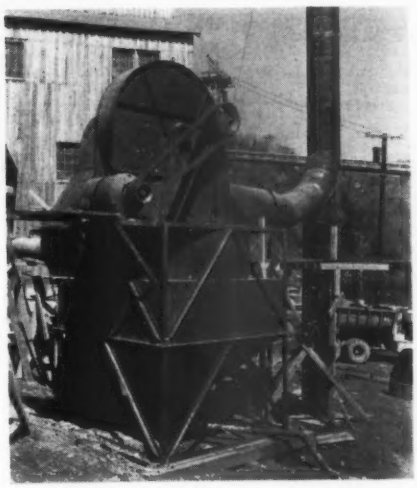
Concrete Material Storage At the C. S. Johnson mixing plant the five sizes of aggregates are discharged from the seventh conveyor (FO-31) through a manually-controlled revolving spout into the eight radial compartments of the 1,300-cubic yard Johnson octagonal bin. These compartments surround a 1,570-barrel capacity central cement compartment.

Bulk cement is unloaded from box cars by Webster automatic power scrapers to three hoppers between two tracks. Over each hopper is a 4- by 7-foot Jeffrey-Traylor single-deck electric vibrating screen with ⅛-inch openings which removes or breaks down lumps. From each pit

Ventilating fan in reclaiming tunnel under raw stock pile.

Jeffrey Mas-Flo chain-flight bulk-cement conveyors carry the cement to 190-cubic foot hoppers over three Robinson air-activated cement-conveying systems. These have 25-barrel-capacity tanks and each pumps about 200 barrels of cement per hour for a distance of about 3,500 feet and up 200 feet into three 6,000 barrel steel bulk-cement-storage silos.

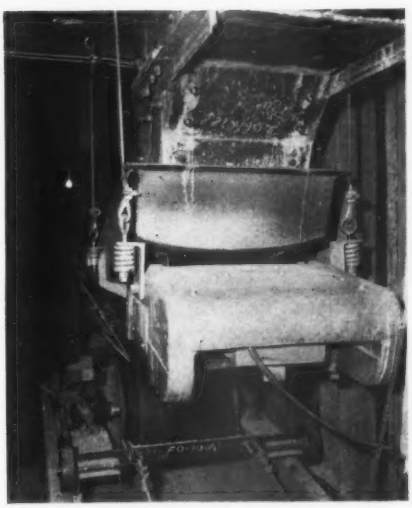
Cement is pumped direct to three silos, but there are actually four silos, one being filled by the two adjacent silos overflowing into the middle silo. Under each of these silos is another Robinson cement-conveying system of the same size and description. These convey the cement a distance of 137 feet and up 160 feet to the 1,570-barrel central cement-storage bin at the mixing plant. These conveying systems



Dust collector serving secondary crushing-and-screening plant.

use compressed air at a pressure of about 70 p.s.i.

Batching and Mixing Eight Johnson weighing batchers are used in this plant, four for crushed stone, two for stone sand and two for cement. These batchers are arranged under their respective bins with the aggregate batchers in a circle around the cement batchers in the center. The aggregates are discharged from the bins through arc gates and the cement through the use of screw-conveyors,



One of the two fine-rock feeders in stone-sand department.

each driven by two electric motors of different speeds, one speed for the major feed and low speed for the final feed. Each batcher is equipped with a multiple-beam scale and an under-and-over indicator. Water is measured in a water-weighing tank.

On the floor below the batchers are five T. L. Smith 4-cubic yard conical tilting mixers also arranged in a circle. The batchers discharge through pneumatically - operated gates into a central revolving spout which feeds the ingredients into each mixer in rotation. The spout is driven through a spur and ring gear arrangement by a small electric motor with limit-switch controls. The concrete is discharged from the mixers into a conical hopper from which a pneumatically-operated arc gate controls its discharge on the first of a series of six belt-conveyors (FO-32 to FO-37) to the dam site.

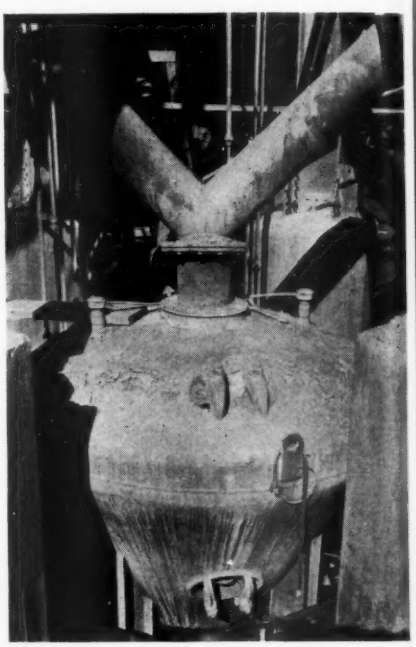
For this plant the T.V.A. in cooperation with the C. S. Johnson Company perfected the automatic control system which has been used in successively improved form at each of its projects. In this plant the control system has a dispatching control board with a push-button and light arrangement which operates the gates, batchers, spout and mixer in an automatic continuous cycle. The dumping of all the batchers is controlled from a push button at the operator's stand and a solenoid type of air valve. Provision is made for dumping in sequence. In another room is a dispatching control board which keeps a check and record on the operation of the system. Only one man is required to operate this plant which has a capacity of 500 cubic yards of concrete per hour. An inspector or dispatcher is stationed at the plant.

In the inspector's room is a stand provided with 5 electrically - operated batch meters for controlling the mixing time. This stand also includes signal lamps to indicate the position of the turnhead opposite any one of the 5 mixers. The stand also provides for mix-selection control and magnetically-operated batch counters.

Concrete Conveying The first concrete conveyor (FO-32) is 42 inches wide and 52 feet long. It can discharge on a 36-inch by 366-foot conveyor (FO-33), which is followed by a 36-inch by 701-foot conveyor (FO-34). This discharges the concrete into two 20-cubic yard tall cylindrical hoppers at the end of the power-house trestle.

The first conveyor (FO-32) can also discharge concrete on a 36-inch by 440 - foot conveyor (FO-35), which in turn can feed to either a 36-inch by 765-foot conveyor (FO-36) running to the low-level trestle or a 36-inch by 511-foot conveyor (FO-37) running to the high-level trestle. Each of these last two conveyors discharges the concrete into a set of four 20-cubic yard tall cylindrical hoppers. All the five concrete conveyors operate on a slope of 13 degrees or less.

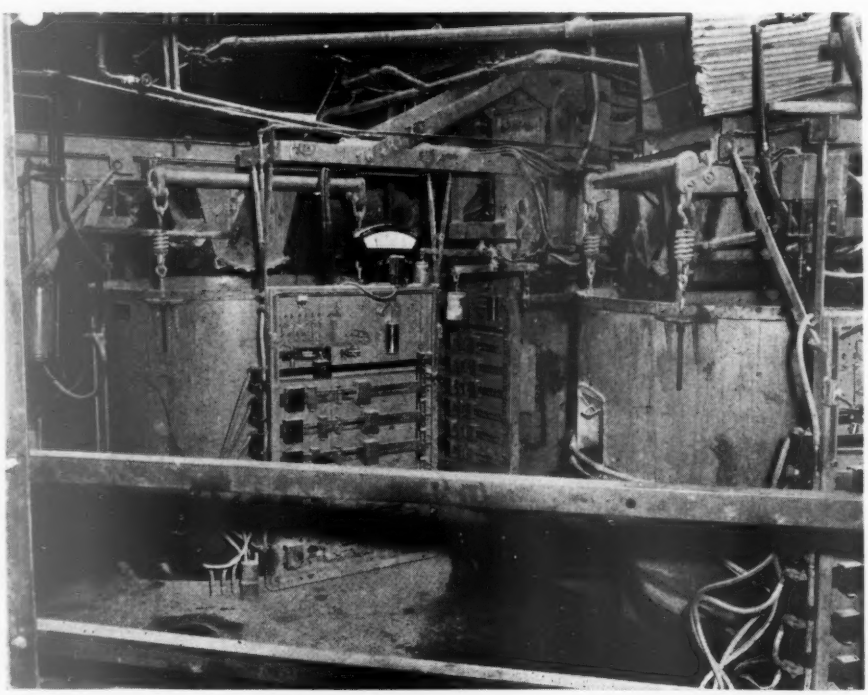
Concrete Delivery The concrete is discharged from these hoppers into 4 - cubic yard concrete buckets of T.V.A. design. These buckets have air-operated bottom-discharge gates and dump their loads in less than 2 seconds. This feature will save weeks of time and considerable manpower and expense during the construction of the dam as it formerly took 15 seconds to empty a bucket with a manually-operated gate. These buckets are mounted on flat cars which have enough space to receive five buckets, four loaded and one empty, from the crane at the place of pouring.



One of the three air-activated cement-conveying systems at the mixing plant.

The cars are hauled by eight locomotives. Three are General Electric 25-ton Diesel-electric locomotives, two are 18-ton Plymouth Diesel locomotives and three are Whitcomb 15-ton locomotives which have been converted from 36-inch to standard gage. At present the concrete buckets and other materials are handled on the low-level trestle by two American 40-ton electric full-revolving traveling cranes, which were brought from Friant Dam in California, and two Colby 300-foot hammer-head cranes. Two Clyde 40-ton cranes are located on the power-house trestle. The high trestle will not be ready for operation until some time in January of 1944.

(*Continued on page* 74)



A view on the batching floor of the concrete plant showing the radial arrangement of batchers, scales and bin gates.

The Wage and Hour Responsibilities of Nonmetallic-Mineral Producers

CEMENT, gypsum, lime, stone, clay and glass products, long intimately associated with the construction of houses and industrial and public buildings, have taken on new significance in the present war emergency. As substitutes for many less plentiful materials, such as metals and lumber, these products are in very wide demand along the industrial front. Nevertheless, the prime use for the industry's products still is in construction.

In the post-war period the deferred demand for housing alone promises a favorable long-run outlook for the industry. Yet the need for millions of new houses does not alone quite guarantee an effective demand. The latter will depend, among other things, on purchasing power, on the amount many of our people have to spend. Shelter looms large in the average family budget and this is another way of saying that labor standards will be a controlling factor in post-war housing construction.

Two Federal statutes affecting labor standards are of interest to PIT AND QUARRY readers. One is the Fair Labor Standards Act of 1938, commonly called the Wage and Hour Law. This act applies to employees engaged in interstate commerce or in the production of goods for interstate commerce. Unless specifically exempted by the act, such employees must be paid at least 30 cents an hour and at least time and one-half their regular rates of pay for all hours worked beyond 40 a week.

This act also directs the Administrator to appoint special industry committees to investigate particular industries and to recommend the highest minimum wage above 30 cents, but not to exceed 40 cents, an hour which will not substantially curtail employment. To date wage orders based on such recommendations have established wage minima above 30 cents in more than 50 industries, the present rates being 40 cents an hour in nearly every case.

Equally representative of employers and employees in the industry and the public, these committees meet around a table to study and discuss the relevant facts—existing wage structures in the industry, the ratio of wages to total production costs, the industry's competitive position and the probable increased cost of proposed wage minima. The give and take of these discussions brings to light any special problems the industry faces and promotes a better understanding of the economic factors involved.

This procedure was followed by a committee for the stone, clay, glass and allied industries which met in New York City on May 27, 1943. That same day the committee, known officially as Industry Committee Number 90, recommended a minimum wage of 40 cents an hour for the following operations:

The mining, quarrying or other extraction and the further processing of all minerals other than metal ores and the manufacture of products from such minerals.

a. It includes, but without limitation, glass and glass products; structural clay products; china, pottery, ceramic whiteware and electrical porcelain products; refractories; dimension and cut stone; crushed stone, sand and gravel; abrasives; cement; concrete, gypsum and plaster products; and talc, soapstone, feldspar, mica, and asbestos products.

b. Provided, however, that the definition shall not include:

Industry	*Effective date*
Dimension Granite	January 15, 1938
Vitreous or Vitrified China	May 19, 1938
Flint Glass	July 12, 1938
Cement	March 2, 1940
Structural Clay Products	October 21, 1941

(1) the extraction of coal, petroleum or natural gases or the manufacture of products therefrom; or

(2) the manufacture of basic chemicals or chemical products; or

(3) any product included in the Metal, Plastics, Machinery, Instrument and Allied Industries (as defined in Administrative Order No. 173) or in the Jewelry Manufacturing Industry as defined in the wage order for such industry.

Data on hourly earnings and employment which the committee had before it indicated that about 20,000 out of an estimated 500,000 wage earners now in the industry are making less than 40 cents an hour. In February 1943, according to the U. S. Bureau of Labor Statistics, the average hourly earnings (including overtime premiums) for workers in the stone, clay and glass products industries were 82.2 cents and for quarrying and nonmetallic mining 74.9 cents. While a breakdown of these figures by regions and branches of the industry indicated that lower average wages prevailed in some areas, it was apparent that hourly earnings generally were well above 40 cents.

The Walsh-Healey Public Contracts Act applies generally to United States Government contracts for materials, supplies and equipment above $10,000. This law sets standards of minimum wages, overtime compensation, child labor and safety and health and forbids the employment of convict labor in the fulfillment of Government contracts, subject to the act.

The minimum wages required under this act are those which the Secretary of Labor has determined to be the prevailing minimum wage for specific industries in specific localities. Wage determinations have been made for nearly 60 industries, with wage rates ranging up to 70 cents an hour.

Several such determinations have been made for cement, stone, clay and glass products. These determinations and their effective dates are as follows:

Hourly minimum wage	
South	32.5 cents
Northeast	57.5 cents
Other states	42.5 cents
42.75 cents	
42.5 cents	
40 to 70 cents (varies by state or region)	
South	34 cents
North	40 cents

Since the minimum wages applicable to particular products and localities are included in the terms of each contract when it is awarded, a detailed break-down by areas and products is omitted.

Basic straight-time hours of work under the Walsh-Healey Act are 8 in any one day or 40 in any one week. Employees must be paid time and one-half their basic hourly rate for all hours worked beyond 8 a day or 40 a week, whichever amount is greater. In this connection it should be noted that the 8-hour period after which overtime must be paid begins when the employee commences work or is required to report for work, whichever is earlier, and his time should be counted so long as he remains at his place of work. In other words, if an employee works, say, from 8 p.m. until 6 a.m. (with an hour off for "lunch") he will have

worked a 9-hour "day" and will be entitled to credit for one hour of daily overtime at time and one-half under the Walsh-Healey Act.

Heretofore this act generally prohibited the employment of boys under 16 and girls under 18 years of age. To facilitate war production the Secretary of Labor has granted an exemption which permits the employment of girls between the ages of 16 and 18. But this employment is subject to several conditions. For instance, these girls may not work more than 8 hours in one day, nor between the hours of 10 p.m. and 6 a.m. And they may not be employed in dangerous or hazardous occupations.

Since Pearl Harbor we have lost more lives on the production front than our Army, Navy and Marine Corps have lost in battle and the toll of industrial injuries is much greater. This heavy drain on our manpower, most of it preventable, lends special importance to the safety and health features of the Walsh-Healey Act. This act requires that goods supplied on a government contract be manufactured or handled under safe and sanitary working conditions.[1]

Many concerns are carrying out advanced safety programs but many more are not and some neglect to take even the most rudimentary precautions. Employers in the latter groups should investigate the work of the National Committee for the Conservation of Manpower in War Industries. Created in 1940 by Secretary of Labor Perkins, this committee last year communicated with more than 10,000 plants engaged in war work. Its membership includes some 550 safety engineers employed by private industry who donate a large part of their time to the work of the committee. Each is a safety expert, well qualified to analyze accident problems in the plant and recommend practical programs for safer operation.

The committee has regional representatives in nine key industrial areas. Employers may communicate with them directly or secure additional information by writing the Division of Labor Standards, United States Department of Labor, Washington, D.C.

The agencies charged with enforcing the wage and hour and Walsh-Healey Laws coöperated closely in the past. To further facilitate the work of administration and enforcement the two agencies were merged last fall under an order of Secretary Perkins. Now called the Wage-and-Hour and Public-Contracts Divisions, they are directed by L. Metcalfe Walling.

Nearly 20,000,000 wage earners in more than half a million establishments are covered by one of or both these statutes, however, both laws have certain exemptions which give them added flexibility.

Thus Section 13(a)(1) of the Fair Labor Standards Act exempts from both the minimum-wage and overtime requirements any person employed in a *bona fide* executive, administrative or professional capacity or in the capacity of outside salesman, as these terms are defined and delimited in Title 29, Chapter V, Code of Federal Regulations Part 541.[2]

To qualify for exemption as an executive the employee's work must be fully in line with the official definition. Among other requirements, his primary duty must be managerial, directing the work of other employees in the establishment; he also must regularly exercise discretionary powers, with the right to hire and fire or make suggestions affecting the status of other employees and must receive a salary of at least $30 a week.

The requirements for exemption as an administrative employee include a monthly salary of at least $200. In addition, such an employee's duties must involve regular and direct non-manual assistance to a "*bona fide* executive or administrative" employee and require the exercise of discretion and independent judgment; or he must perform under only general supervision responsible non-manual work related to management policies or general business operations involving the exercise of discretion and independent judgment; or his work must involve the execution under only general supervision of special tasks directly related to management policies or general business operations.

Many large concerns, especially, have employees who may qualify for exemption in this category, among them are personnel managers, safety directors, claim agents, credit managers and auditors. Titles are not controlling, however, since it is the nature of the employee's duties together with the salary test which determines the applicability of the exemption. For this reason employers should familiarize themselves with Part 541 of the Regulations.

The salary requirement for professional employees also is $200 monthly[3] and here, too, the nature of the work performed (and the employee's qualifications) must coincide with the duties given in the official Regulations.

There is no salary test for outside salesmen. As defined, this term means essentially any employee who is customarily and regularly engaged away from his employer's place of business in making sales or obtaining orders or contracts.

Employers in areas where the 48-hour week is now mandatory are reminded that nothing in President Roosevelt's executive order supersedes or conflicts with the Fair Labor Standards Act, the Walsh-Healey Public Contracts Act, or any other federal, state or local laws on hours of work or overtime compensation. Thus, employees who are entitled to time and one-half under the Wage and Hour Law must be paid in accordance with this provision in areas where a minimum 48-hour week is mandatory.

Employees who qualify for exemption under Section 13(a)(1) of the wage-and-hour law also will be exempt from the wage-and-hour provisions of the Walsh-Healey Act. Moreover, the latter statute does not apply to office and supervisory employees, to certain maintenance workers or to custodial workers, but these groups may be covered by the Fair Labor Standards Act unless they meet the requirements for exemption under Section 13(a)(1).

Some readers will be interested in Section 7(b)(3) of the wage-and-hour law which provides a partial exemption from the overtime requirements for employees engaged in industries that the Administrator has found to be of a seasonal nature. Employees who come within this exemption may work up to 12 hours a day or 56 hours in any one work week during a total of 14 weeks in any calendar year without the payment of time and one-half for overtime.

The Administrator has found the following branches of the nonmetallic-mineral industries to be of a seasonal nature:

Sand and Gravel: Excavation of sand and gravel, but not industrial sand, from open cuts, including necessary milling operations incidental thereto. The northern branch only is exempt.[4]

[1] In locations where state laws establish safety and health standards observance of such regulations will be taken as *prima facie* evidence that employers are in compliance with these provisions of the Walsh-Healey Act.

[2] Copies of these regulations and other informative material mentioned in this article are available without cost at all offices of the Wage and Hour and Public Contracts Divisions, including the National Office, 165 West 46th Street, New York City.

[3] There is no salary requirement for qualified lawyers and physicians who are engaged in the practice of law or medicine.

(*Continued on page* 66)

South Bend Producer Builds Effective Device for Elimination of Soft Stone

Plant of the South Bend Sand & Gravel Company with elevator serving central-mixed-concrete plant in foreground.

another ON THE SPOT report

THE presence of soft shale and ocher in the deposit of the South Bend Sand & Gravel Company at South Bend, Indiana, has for many years been a constant source of annoyance to Julius B. Christman, head of the concern. Various devices to eliminate these soft materials were tried over a period of years without success. Then Mr. Christman began working on an idea of his own and, after five years

By HARRY F. UTLEY

of experimenting, has developed a soft-stone eliminator that is doing a really effective job.

The device, on which United States Patent No. 2,306,427 was granted a few months ago, is similar in appearance to a pair of crushing rolls except that one roll is of corrugated steel and the other of rubber. Power is applied to the steel roll, the rubber roll turning by friction. The rubber is sufficiently resilient to allow hard, dense gravel to pass through without breakage yet firm enough to crush the softer shale and lumps of ocher. The crushed soft material is then flumed away to waste from the scrubbers which take the product of the eliminator.

The key to the effectiveness of the eliminator lies in the proper compounding of the rubber used on the secondary roll and in perfecting it Mr. Christman had the coöperation of the Western Rubber Company of Goshen, Indiana. When a roll of the proper resiliency was finally built it wore out too rapidly and further development was carried on to increase its operating life. The one now in use at the South Bend plant has been in service nearly a year with little indication of wear.

The feed at the plant is split, part of it being subject to treatment by the soft-stone eliminator and the remainder, not sold as specification material, is untreated. To an observer above the bins there is a marked difference in the appearance of the two products. The gravel with the shale and ocher eliminated is uniformly white to blue in color, while the untreated gravel is yellowish to brown in appearance due to the presence of the ocher. The present "tight" rubber situation due to the war has made it impossible to build another eliminator to treat the remainder of the material but, as soon as the rubber situation becomes less critical, this will be remedied. It is also planned to market the device commercially in the future.

The soft-stone eliminator in operation. The first roll is rubber-covered.

The deposit at South Bend has been worked for many years and was acquired by the present owners about ten years ago from the George A. Hoffman Gravel Company. The pit is now about a mile from the plant, good material being found to a depth of about 25 feet overlaid by about 3 feet of spoil. The pit excavator, a Page 220 Diesel dragline pulling a 3- cubic yard bucket, loads directly into Western side-dump cars which are drawn over standard-gage tracks by a Porter 40-ton saddle-tank steam locomotive and a Plymouth 20-ton gasoline locomotive. The cars dump into a track hopper through an 8-inch rail grizzly, a 26-inch by 60-foot belt-conveyor carrying the pit-run material, up to a 3- by 10-foot double-deck Simplicity screen. The throughs pass to the plant conveyor, while the plus-1¼-inch oversize is reduced by a Traylor gyratory and a Telsmith intercone crusher, their products passing to the 24-inch by 170-foot plant conveyor equipped with Cincinnati Rubber belting. From 20 to 25 per cent. of the feed to the plant is crushed material.

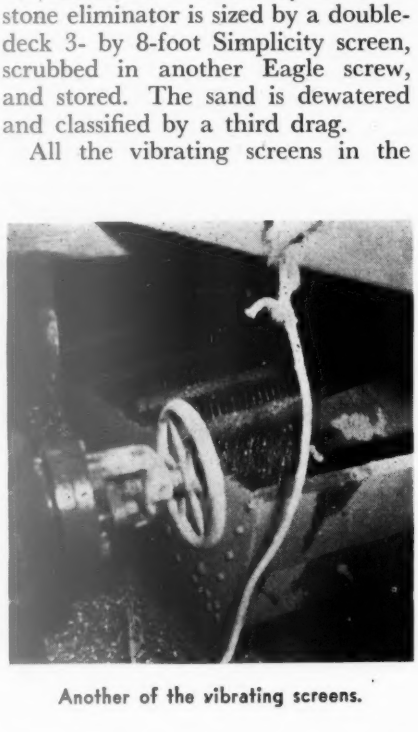
One of the sizing screens equipped with washing sprays.

A divider in the chute at the top of the plant splits the feed as previously mentioned. That going to the eliminator is handled first by a 4- by 10-foot double-deck Symons screen which takes out the fine and coarse sands which are passed to two

plant-built drags 20 and 24 feet long. The oversize, after passing through the disintegrator, is scrubbed in a Stephens-Adamson log-washer and then sized by a 4- by 10-foot triple-deck Simplicity screen, the products dropping into the bins. The finest material is first subjected to further cleaning in an Eagle screw-washer.

Material not treated by the soft-stone eliminator is sized by a double-deck 3- by 8-foot Simplicity screen, scrubbed in another Eagle screw, and stored. The sand is dewatered and classified by a third drag.

All the vibrating screens in the



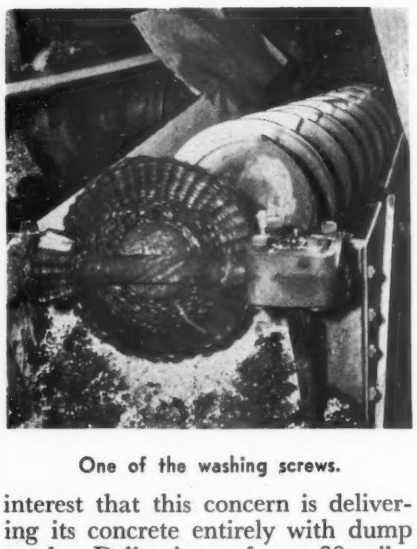
Another of the vibrating screens.

plant, with the exception of the scalper ahead of the crushers, are equipped with washing sprays.

The six timber storage bins have a combined capacity of about 2,500 tons. The plant has a rated output of about 150 tons per hour.

Alongside the bins, the Kuert Concrete Company operates a central-mixing plant employing C. S. Johnson bins and batchers and a 2-cubic yard Smith tilting mixer. It is of

The saddle-tank steam locomotive.



One of the washing screws.

interest that this concern is delivering its concrete entirely with dump trucks. Deliveries as far as 20 miles away are made without appreciable segregation, the firm reports. The concrete is designed for a low slump. Vinsol-resin cement, shipped in bulk by railway is used exclusively. According to the management, the use of this type of cement alone has made it possible to prepare concrete which resists segregation and prevents bleeding without agitating it in transit.

Wage and Hour (from page 64)

Crushed Stone: Quarrying of crushed stone from surface or open cuts and necessary milling activity incidental thereto. Northern branch only.[4]

Brick Manufacturing: The manufacture of brick not including the extraction of clay. Maine, Vermont and New Hampshire only.

Some types of construction work are not subject to the wage-and-hour law. In general, the Division has held that employees engaged in original construction of such buildings as apartment houses, churches, barracks and schools are not covered by the act. However, employees engaged in ordering, receiving or unloading materials in interstate commerce are covered by it.

The status of employees engaged in construction work, including reconstruction, maintenance and repair work, is fully discussed in Interpretative Bulletin No. 5, and a special release, G-162, both issued by the Division. The subject is too broad and varied for treatment here. Employers who have problems regarding the coverage of their employees are urged to consult the nearest office of the Wage and Hour and Public Contracts Divisions.

In general, the Walsh-Healey Act does not apply to the contracts for the construction of public works, including buildings, bridges, highways, airports and ships other than United States naval vessels. This act does apply, however, to United States government contracts for materials used in construction, such as crushed stone, sand and gravel, cement, ready-mixed concrete.

Neither of these laws applies to employees of the United States government or to employees of any state or political subdivision thereof.

All employers who are subject to either act must keep certain time and payroll records showing, among other things, the hours worked, the rates of pay, and overtime compensation. No special forms are needed, but the required information must be complete, accurate and readily available.

Most employers to-day are anxious to meet their responsibilities in maintaining decent labor standards and voluntary compliance is the widespread rule. Would-be-violators are reminded that both acts contain strict penalty provisions. For wilful violation of the wage-and-hour law these include fines up to $10,000 and, for second offenders, imprisonment up to six months, a fine or both. Failure to comply with the Walsh-Healey Act may bring cancellation of the contract and, where flagrant violations are found, employers can be denied federal contracts for a three-year period.

Compliance is not only good insurance, it is good business as well. For even in these unusual times decent labor standards help to remove one speculative element in business costs and put the competitive emphasis where it belongs—on better production methods and merchandising. This stabilizing effect will be even more marked when the war is won and this country's intricate business and industrial structure swings back to peace-time pursuits. We will need the safeguards that wise legislation has provided. We must have good labor standards if living standards in the future are to match the huge productive resources that will be at our disposal.

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[4]All counties in Iowa, Maine, Minnesota, Montana, New Hampshire, North Dakota, South Dakota, Utah, Vermont, Wisconsin, and Wyoming. Certain counties in Colorado, Connecticut, Idaho, Michigan, Nebraska, New York, Illinois, Indiana, Massachusetts, Missouri, Nevada, New Mexico, Ohio, Oregon, Pennsylvania and Washington.

The Chain Belt Company announces the appointment of William W. Klemme as district manager of industrial sales in Dallas. Mr. Klemme, previously District Manager at Buffalo has been connected with the company since 1935.

GETTING LONGER LIFE FROM BRAKE AND CLUTCH LININGS

Part 1—Correct Adjustment and Maintenance

another P and Q exclusive

BRAKES and clutches bring mechanisms down to a stop or up to a speed by transforming surplus energy into frictional heat. It is the duty of the designers of brakes and clutches to provide adequate means of dissipating this frictional heat fast enough so that the temperature of the parts that rub against each other will be kept low enough to prevent rapid destruction of the friction materials and the surfaces against which they rub.

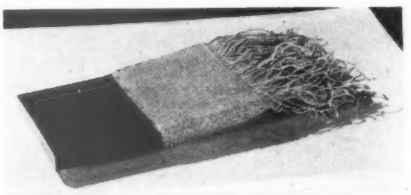
Most brakes and clutches are well designed for their specific purposes, yet many bands, blocks, disks and cones wear out, burn out or glaze before they should, and many metal rubbing surfaces are scored and heat-checked, causing expensive losses of time and costs for materials.

There are six reasons why friction materials fail: (1) Incorrect adjustment, (2) unskilled operation, (3) careless maintenance, (4) incompetent repairing, (5) faulty selection, and (6) improper application.

Correct Adjustments One of the common causes of the early failure of friction materials in brakes and clutches is incorrect adjustment of the mechanisms. Practically every manufacturer of equipment provides complete instructions for brake and clutch adjustment, but these instructions are too frequently mislaid and can not be found just when they are most needed.

In this article it would be impossible to give other than general suggestions for brake and clutch adjustments because there are far too many different makes of the eight basic types — disk-riveted-to-plate, floating-disk, disk-insert, cone-facing, molded-cone block, internal-expanding, external-contracting, and line-contact drives. In the catalog of one friction-materials manufacturer alone there are more than 1,000 brakes and clutches listed for widely used excavating and earth-moving equipment of various makes.

Proper adjustment of lever linkage makes friction materials last longer because the engaging force can then be applied properly. Shifter collars and toggles should not be expected to make disks, cones or bands engage smoothly and firmly unless the prior actuating mechanisms operate accurately.

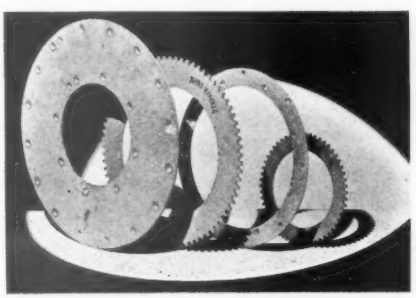


The evolution of woven friction material from asbestos yarn to listing to impregnated compressed lining. (Courtesy Johns-Manville Corporation.)

After adjustment of the link motions, check the toggle adjustment, the guides, etc. so that the friction material has exactly the clearance recommended by the equipment manufacturer. Avoid such tight clearances that the mechanisms can not toggle in properly. Tighten only enough so that the brake or clutch will hold without slipping when engaged, yet not drag when released. The object of such adjustments is to provide not only proper clearances for friction material, but also to provide *uniform* contact of *all* the friction material at the instant of engagement against the surface on which it rubs.

By SPENCER JONES

Non-uniform contact means that the high spots wear out more quickly because they become excessively hot. Such high spots are forced to carry most of the load and may generate temperatures higher than any commercial friction material can withstand for more than an instant. Yet because these high spots are the first to engage, they are also the last to disengage, hence are often subjected to a soaking heat—a highly destructive condition.



Left to right—molded clutch facing, molded clutch facing with gear teeth, formed and joined type of woven clutch facing, molded gear-toothed clutch facing. (Courtesy Johns-Manville Corporation.)

Some clutches are designed to allow a slight slipping when heavy shocks are encountered, as in heavy digging with a power shovel. These compensating clutches are frequently built with a pre-loaded spring which exerts a definite force at a definite length. Avoid changing these spring settings, as they determine the amount the clutch can slip under shock. Such clutches usually require adjustment only for lining wear, with proper allowance being made in the clearances, depending on whether the clutch is hot or cold when the adjustment is made.

Correct Operation Correct operation can add much to the life of friction materials. Careless operation is too frequently encountered, as is evidenced by the following quotation from the instruction folder of one of the largest shovel manufacturers: "Avoid the power-wasting habit of 'riding' the crowd brake when crowding or retracting the dipper handle. Do not hoist with the dipper handle upper stop in contact with the saddle blocks. Operating in this manner decreases the life of the crowd cable by forcing it to rotate the forward drum opposed by the crowd foot brake. If, while hoisting, the upper stop comes in contact with the saddle block, retract the handle 5 or 6 inches by partially releasing the crowd foot brake. Keep the crowd foot brake as loose as possible for ease of operation and long cable life."

Abrasive dirt and grit are destructive of friction materials. Some people may think that a little grit on a lining might even increase its effectiveness, but this is not the case because friction materials are not dependent on their abrasiveness for efficient action; all that grit does is to wear out both linings and drums. A good operator keeps abrasive dirt and grit out of his brakes and clutches.

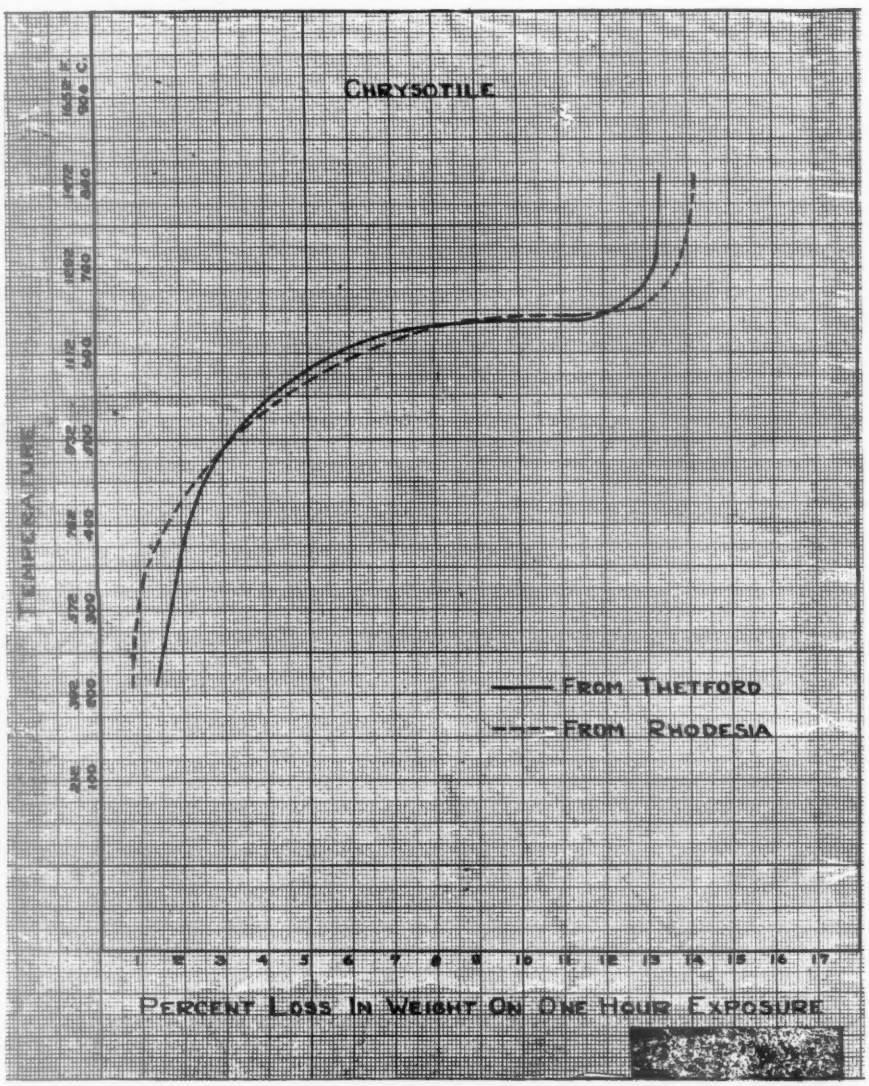
Abrupt application of brakes or clutches is not particularly destruc-

tive of friction materials, although it is not likely to improve mechanisms. It is the riding or prolonged continuance of rubbing which creates a soaking heat and destroys friction materials quickly, even though the power-wasting stresses thus set up may be easier on the mechanisms. Half-way between jerky and dragging operation there is a reasonable point at which the life of friction materials and mechanisms will both be prolonged.

There are, of course, a few devices which are purposely designed to drag the friction material against a rubbing surface continually. Typical of these is the power-operated dipper trip on some shovels, where the dipper-trip drum is held in contact with a friction disk to cause just sufficient drag to make the trip cable follow the dipper handle in all its movements. But such devices are designed for that specific purpose, whereas most brakes and clutches are designed to be either running free and clear or engaged.

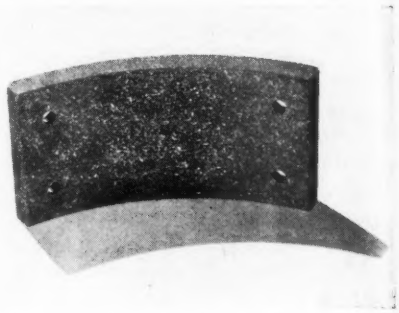
Correct Maintenance Correct maintenance involves not only lubrication and minor adjustments, but also intelligent inspection. A good maintenance man will do more than keep equipment running properly. He will also detect the need of repairs before the repairs become absolutely necessary, so that defective or worn parts can be fixed or replaced when the equipment is normally idle, instead of failing unexpectedly and causing a shutdown at a time when the equipment should be producing.

Lubricate brake- and clutch-actuating mechanisms exactly in accordance with the manufacturers' instructions. If they say to use prepared ball-bearing grease, do not use graphite grease. If they say to lubricate once every 20 shifts, or every 5 shifts, keep on schedule. Lubrication is frequently the joint responsibility of the maintenance man and the operator, so there should be a definite understanding as to who does what.



Graph showing effect of heat on asbestos from Canada and Africa. (Courtesy Reybestos Division, Raybestos-Manhattan, Inc.

Correct lubrication can lengthen the life of friction materials, when applied in the correct places. Lever linkages, collars, toggles, etc. must work smoothly or linings or blocks may not engage properly. Worse yet, they may not return to the "off" position, but may drag. The most careful adjustments can not make up for neglected lubrication, and, incidentally, all parts of the brake and



Molded brake block for band brakes and clutches. (Courtesy Johns-Manville Corporation.)

clutch mechanisms should be properly lubricated and working freely before any adjustments are made.

Be very careful to keep lubricants off the surface of the friction material. This is a job for which the maintenance man and the operator are both responsible. Oil and grease decrease the efficiency of friction materials tremendously, make them slip, soften rubberized linings, reduce their coefficiency of friction as much as 60 per cent., and cause sporadic grabbing or erratic action. A common cause of glazed linings is the presence of a small amount of oil which has carbonized on the rubbing surface.

Never apply any compounds, clay, soapstone or other foreign substances on friction materials to try to make them hold better. There is no known compound, dressing or material that is safe to use on brakes and clutches, not even water. All such substances appear to have a destructive effect either on the friction materials or on the surfaces against which they rub.

So far as friction materials are concerned, by and of themselves, the maintenance is easy. Be sure the mechanisms are correctly adjusted; be sure there is no oil, grease or other foreign substance on the friction materials or the parts against which they rub; then check to see that there is still plenty of clearance between every rivet or bolt and the drums or other surfaces against which the friction materials rub. If the friction materials are worn down so that the rivets or bolts may become flush in a very few more shifts,

(*Continued on page* 76)

"Black Top" for Paving Iowa Airfield Mixed, Laid During Coldest Weather

MANY stories have been told of the severe weather conditions which have had to be combatted in carrying on the huge construction program which is so vital to our war effort. Many projects were built during seasons of the year when, in peace time, practically no construction work is done. Such a project is the Ottumwa Naval Air Station near Ottumwa, Iowa, a primary training station for naval aviation personnel. Construction was begun late in 1942 and was carried on throughout the winter.

The general contract for the construction of this base was awarded to Sollitt, Lancaster & White, a consolidation of building, excavating and paving contractors from Chicago and Omaha. The paving included two concrete runways for heavy planes and two octagonal landing mats and a drill field of bituminous construction. The bituminized aggregates for the latter were supplied by a new Simplicity System Model S-75 asphalt plant operated by the contractors. Erection of this plant was begun on November 1 and it was in operation on November 15. From that date until early in the summer of 1943 this plant was operated whenever material was needed at the project where construction was carried on almost without interruption through one of the worst winters and one of the wettest spring seasons on record. Because of these severe weather conditions the entire plant was inclosed.

The landing mats are irregularly octagonal in shape and are 2,600 feet across with two opposite long sides each measuring 1,900 feet. These mats have 6-inch soil-cement bases over which is a 2-inch asphalt surface. Each mat required 35,000 tons of bituminized aggregates. The first one was completed 33 days after the plant went into operation in spite of the severe weather conditions. Equally good records were made in completing the second mat and the 600- by 1,000-foot drill field which is the same type of construction. A Barber-Greene spreader was used to place this material. The Simplicity asphalt plant easily produced 110 tons per hour over long periods and has averaged 120 tons per hour for a 10-hour day. This was done with a crew of 12 men including the tractor and crane operators and the foreman.

All the aggregates for the concrete runways and for other concrete construction was batched at four plants which, with the asphalt plant, are located at a railway siding four miles from the project. The concrete was mixed and placed by pavers.

The aggregates used consisted of sand, pea gravel, and ½-inch crushed limestone. Standard Oil 80-90 penetration bitumen was used with Portland cement as the dust filler. The sheet asphaltic-concrete mixture used consisted of ½ sand, ¼ pea gravel and ¼ limestone with 6½ per cent. of Portland cement added in each 5,000-pound batch.

All the aggregates were received in trucks and an International TD14 Diesel tractor with a Bucyrus-Erie bulldozer stock-piled them to a height of about 20 feet. This machine also moved these materials within reach of a Koehring crawler crane with an International Diesel engine and a 1¼-cubic yard Owen clamshell bucket. This deposited the aggregates on a variable-speed apron-feeder ahead of the cold-stone

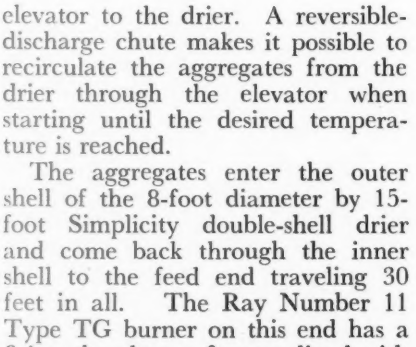
Clam-shell crane feeding aggregates to the asphalt plant.

Oil burner on the double-shell drier.

Another view of the plant with loaded truck ready to leave.

elevator to the drier. A reversible-discharge chute makes it possible to recirculate the aggregates from the drier through the elevator when starting until the desired temperature is reached.

The aggregates enter the outer shell of the 8-foot diameter by 15-foot Simplicity double-shell drier and come back through the inner shell to the feed end traveling 30 feet in all. The Ray Number 11 Type TG burner on this end has a firing chamber or furnace lined with A. P. Green firebrick and burns No. 3 Standard Oil fuel oil. This burner uses steam to actuate a high-speed turbine which mechanically atomizes the fuel oil. Steam is used



Tractor and bulldozer used for stock-piling and reclaiming aggregates.

for vaporizing the oil. Two tanks, one of 10,000 and the other of 14,000 gallons capacity, are used for fuel-oil storage.

A Clarage Size 33 exhaust fan draws 20,000 c.f.m. of air through the drier counter to the flow of the material into a Number 91 cyclone dust-collector from which the air is exhausted to the atmosphere through a steel stack. The collected dust is discharged with the stone from the drier to the hot-stone bucket-elevator. This elevator discharges these materials on a 4- by 12-foot, 2-deck, fully-inclosed Symons screen on the top of the plant aggregate bins. The screen has ½- and ¼-inch openings. Any plus ½-inch material is chuted to a waste pile. Two of the four compartments of the 50-ton bin are used for minus-¼-inch material and one for ¼- to ½-inch material. A fifth compartment is provided in the form of a separate surge hopper for the filler dust, in this case cement, which is discharged from sacks to a screw conveyor followed by a bucket-elevator which feeds the above hopper. Bindicators keep the levels of the materials in these bins within predetermined limits.

Steam-actuated, hand-operated valves control the bin gates which feed the two sizes of aggregates and the cement in sequence into a 5,000-pound weigh box equipped with a Kron 6,000-pound capacity springless dial scale.

The bitumen is received in tank cars on a siding and is steam-heated to a temperature of from 250 to 300 degrees F. before unloading. A pump feeds the bitumen through a

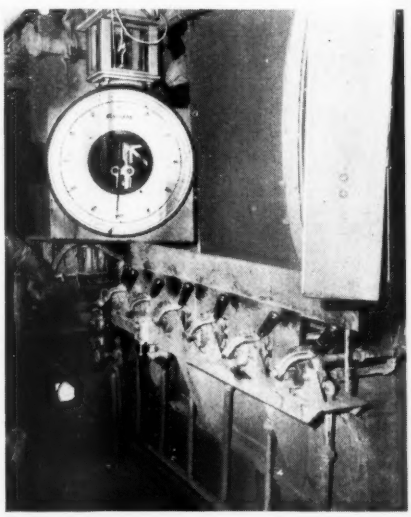
Batch being discharged from mixer gates.

4-inch pipe line to the accumulator tank in the plant. When this tank is full, a relief valve causes the material to flow through other lines to the three storage tanks. One is a Simplicity 24,000-gallon "Hot-Well" tank equipped with a central preheating coil. The other two 15,000-gallon tanks have ordinary steam coils. The same pump feeds from these tanks to the plant through steam-jacketed, asbestos-covered lines.

The asphalt super-heat tank on the mixing tower holds slightly more than enough bitumen for one batch. A steam-cylinder-operated valve controls the feed of this material into the 600-pound capacity steam-heated weigh bucket, which is equipped with a Kron dial scale. A Kinney asphalt pump sprays the asphalt uniformly over the mixer through spray nozzles.

Steam-operated valves on the aggregate and bitumen batchers control the discharge of these ingredients into the Simplicity 5,000-pound mixer. This machine is the 2-shaft, pug-mill type with steam-operated sliding gates for discharging into hired trucks for delivery. The mixer is steam-jacketed and has replaceable manganese-steel liner plates. All the steam used in this plant is supplied by an oil-fired Erie 100-horsepower boiler. The steam is used for heating the asphalt, operating the bin, weigh box and mixer gates, and atomizing the fuel oil.

Three International gasoline engines drive all the plant equipment. A Type UD14 engine drives the drier, the cold-stone elevator and the apron-feeder through a Falk gear-reducer, roller chain and gears. A UD18 engine drives the mixer, the dust elevator, the hot-stone elevator and the screen through a Falk gear reducer, roller chain and gears. Another UD18 engine drives the fan direct.



Dial scale on aggregate and bitumen weigh buckets. Valves controlling steam-operated gates in foreground.

A 15,000-gallon storage tank near the plant is used for RC3 cut-back asphalt, which is heated and loaded into a distributor truck that spreads it as a tack coat to bind the surface to the base.

Installs Diesel Engine at New Quarry Plant

The Princeville Stone Company, new crushed-stone operator at Princeville, Illinois has just installed a 150-horsepower Caterpillar Diesel engine to supply power.

Howard Markgraf is manager and agricultural stone is the chief product.

AIR COMPRESSORS

Part I—Their Selection and Installation

By C. W. GIBBS
Compressor Engineering Department, Ingersoll-Rand Company

COMPRESSED air is a utility with many advantages. Safety in many places makes its use mandatory. Its superior utility dictates its use in other instances. Many types of work would be difficult to accomplish with any other power medium.

Our association with compressed air as individuals is so extremely close, that it is seldom realized how dependent we are upon it. If all the compressed air in the United States were suddenly released, not a train, automobile, truck, bus, trolley car, or airplane would move. Many industries would be completely shut down. Power-houses would have difficulty in functioning properly; refineries would stop or reduce operations; processes could not be satisfactorily controlled and the quality of products would suffer. The movement of materials would in many cases be prevented; many large cities would have no sewage disposal; mining and quarrying would cease.

Compressed air is probably "handled" by more workmen in the average plant than either steam or electricity. Because of this widespread use which extends even to small operations—every automobile filling station has a compressor—the installation and operation of compressed-air systems is important.

In many instances the power cost for operating a compressor 8 to 10 hours a day, 300 days a year, will exceed the original cost of the compressor every year of its use. This means that care must first be taken to insure the selection of the proper type of machine for the job and its correct installation with suitable accessories. After that come correct operation and maintenance.

This discussion will be limited to reciprocating compressors which are the predominant type in industry.

Selecting the Compressor Before deciding upon the type of compressor to be considered, certain fundamentals must be settled. First among these are the operating pressure required, particularly the maximum, and the total capacity of air which will be involved. Right here it might be pertinent to point out that practically every air-compressor plant which is put in, eventually becomes too small because of the increased demands for compressed air, once this is made available. Hence, do not skimp on size.

The operating pressure is important. The generally accepted value is 100 to 115 pounds gage at the compressor, the lower pressure being the more usual in quarries and mines.

Another item which must be considered carefully is the question of the service for which the compressor will be used. This includes the load factor, which is the percentage of the total time during which the unit will actually be operated. Also included is the necessity for absolutely dependable service, the difficulty which will be encountered in case of a compressor shutdown and the need for stand-by equipment.

The type of drive is usually determined by the economics of the situation and the availability of various sources of power, and also, to some degree, by the size of the plant. Electric-motor, steam-, gasoline-, gas-, and oil-engine drives are available.

Control of the Compressor Control of the compressor output is necessary to maintain the discharge pressure within reasonable limits and to compress only as much air as is being used.

A range of 10 pounds between the loading and unloading points is close enough for normal operation, although there are some cases where a smaller range is desirable. Compressor manufacturers are equipped to supply this where needed, but producers should not ask for close-range regulation unless it is definitely required. The more often a regulator operates, the greater is the wear on the regulating apparatus and the more frequent is the load change on the driver.

Three general types of control are available, depending upon the prime mover and the compressor application. These include:

(1) Automatic stop-and-start control, under which the unit operates continuously at full load until the pressure is built up to a certain maximum; then the compressor is automatically stopped and does not operate again until the pressure has fallen to a predetermined lower value. Automatic start-and-stop units are universally electric-motor-driven.

(2) Variable control, as on steam-driven machines and on gas-engine units, with which it is usually possible to vary the speed in accordance with the demand for compressed air, with a limit on the minimum speed. This is probably the most satisfactory of all controls but, of course, can not be applied to electrically-driven units.

(3) Constant-speed control, such as provided by electric units, which are, of necessity, constant-speed machines. Where automatic start-and-stop is not used, some form of output control, which will function to vary the capacity while the machine still runs at full speed is needed. Hence, the term "constant-speed control." There are two types. "All on-All off" means that the unit delivers full capacity or none. "Step" control means that the capacity is varied in steps to give Full, ¾, ½, ¼ and No Load or Full, ½ and No Load. A discussion of the various ways of obtaining these ends would take more space than is available.

Many combinations of controls are available for special applications and almost any reasonable requirement can be met by the manufacturers. It is important, however, not to complicate the operation with any more controls than are necessary to accomplish the essential results.

Duty One point which is sometimes overlooked must be mentioned. There are two classifications of compressor service. There is the *light-duty* and the *heavy-duty* job.

Light duty might be represented by the provision of compressed air for a system of automatic controls and not for any other purposes. A light-duty compressor would usually be an automatic stop-and-start machine operating for possibly from 10 to 30 minutes at a time, and not more than, say, 3 to 4 hours total during a day. Internal-combustion

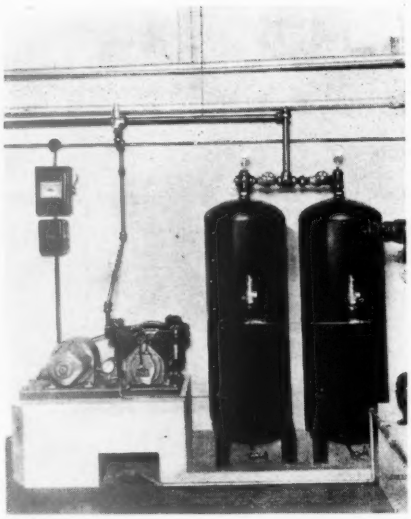


Figure 1. Internal-combustion-engine starting unit. Air-cooled, automatic start and stop.

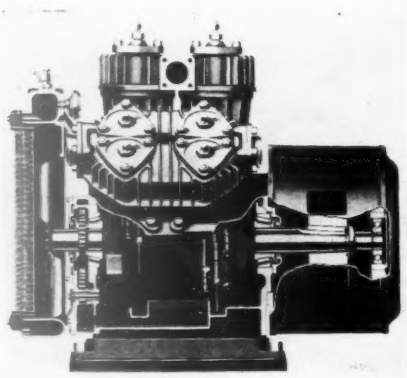


Figure 2. Semi-heavy-duty compressor with built-in motor, often used for stand-by service.

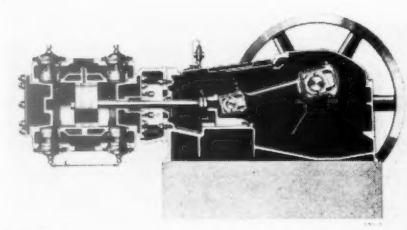


Figure 3. Heavy-duty, single-stage air-cooled compressor.

engine starting units are usually of the light-duty type.

Heavy-duty service is that in which the air is needed for regular plant supply and in which the compressor must be able to run continuously at full load if necessary and must be absolutely dependable for many years.

The light-duty machine is usually of relatively high speed, of the vertical or V type and is frequently air-cooled. The heavy-duty machine is almost universally horizontal, runs at moderate speed and is water-cooled. The heavy-duty machine will obviously cost more, but it has more life built into it and also will be more economical to operate from a power and up-keep standpoint.

This does not necessarily mean that a light-duty machine can not on occasion take over a heavy-duty job for a certain length of time, but its purchaser must understand that the economy will not be as great as that of a heavy-duty unit and the maintenance cost will be considerably greater.

Figure 1 shows a typical light-duty automatic start-and-stop machine built in sizes up to 10 or 15 brake horsepower. Machines of this general type are widely used in industry for intermittent jobs. They are air-cooled.

A semi-heavy-duty type of compressor is shown in Figure 2. Machines of this type are available in designs up to 200 horsepower and are also air-cooled. Operating at fairly high speeds and being electrically-driven it may be fitted with a belted, coupled or built-in motor. Automatic start-and-stop or constant-speed control or a combination of these is available to allow operation under the most favorable conditions. These units are frequently used to provide stand-by or off-peak service and to allow the shutting down of larger main compressors.

Beyond these types the heavy-duty water-cooled designs prevail. These range from 15 to 1,200 horsepower per unit and may be larger if necessary.

Power Source Steam-driven units are available from 15 horsepower up. The steam cylinders are designed for a wide range of steam conditions to fit almost any desired boiler pressure. These units are particularly useful where exhaust steam is needed for process heating.

The most generally used main-compressor power source is the synchronous motor, available in sizes starting at about 50 horsepower. This design usually has two stages of air compression which reduces the power requirements over single-stage by 12 to 15 per cent. Figure 4 shows such a unit.

One of the advantages of a synchronous-motor drive lies in the fact that this type of motor is extremely well suited to the correction of certain types of power-line difficulties through its ability to increase the power factor on the line. Synchronous motors also have further very definite advantages for compressor driving in that they can be mounted directly in the compressor shaft the same as a flywheel and require no couplings, belts or other transmission apparatus. Their electrical efficiency is high.

Motors with leading power factors are very easily applied, 80 per cent. power-factor motors being a standard which most compressor manufacturers show in their price lists. There are numerous ways of improving the power-factor, but one of the best is the use of synchronous motors to drive equipment such as air-compressors. The analysis of power-factor problems is sometimes complicated, but the use of a synchronous-motor-driven compressor will always improve the power factor.

Some plants may be favorably situated to use gas- or oil-engine-driven compressors. Figure 5 shows such a plant. For instance, it is

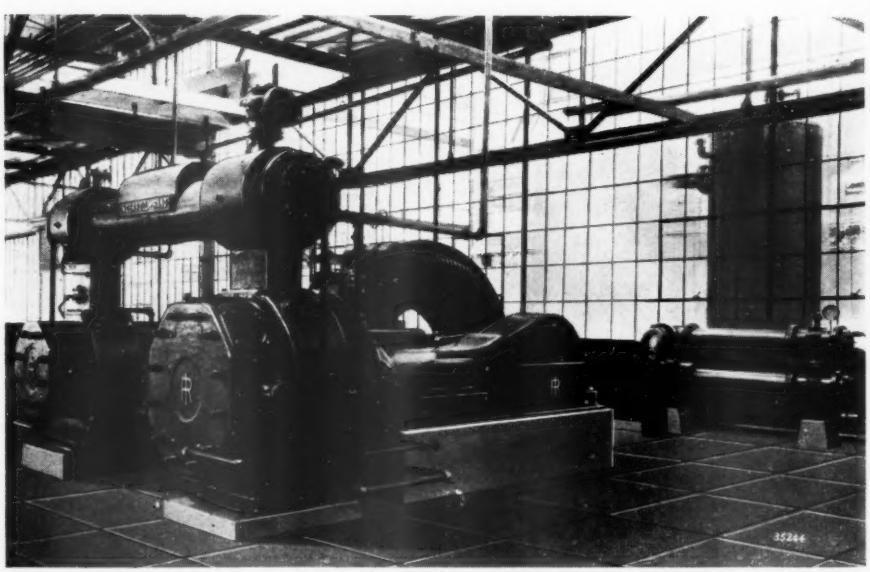


Figure 4. Two-stage compressor installation with after cooler at right and receiver outdoors. A fine example of a good installation.

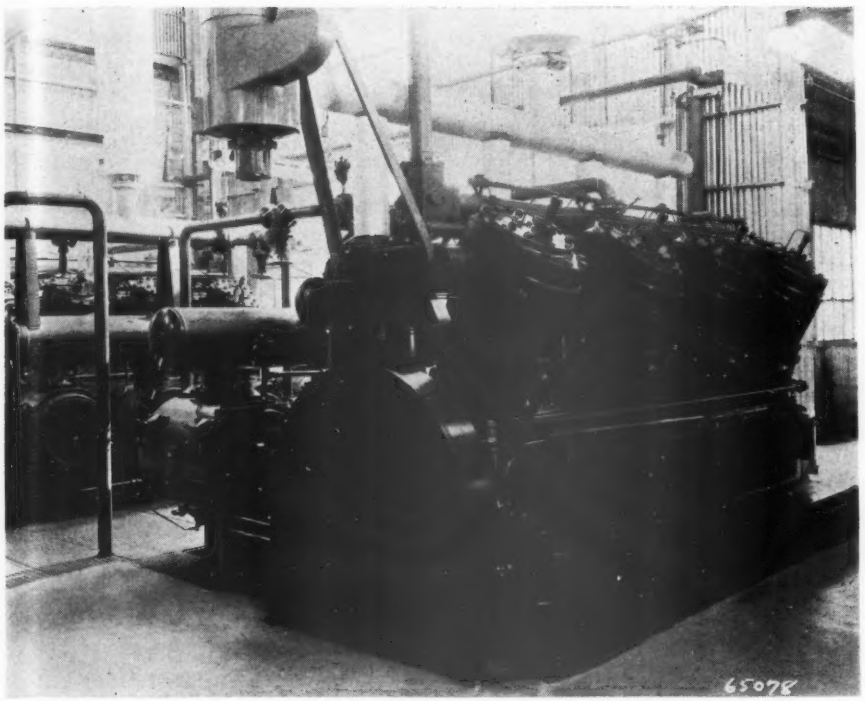


Figure 5. A modern gas-engine-driven compressor plant. Note that the V-type engine and horizontal compressor are engineered as a unit.

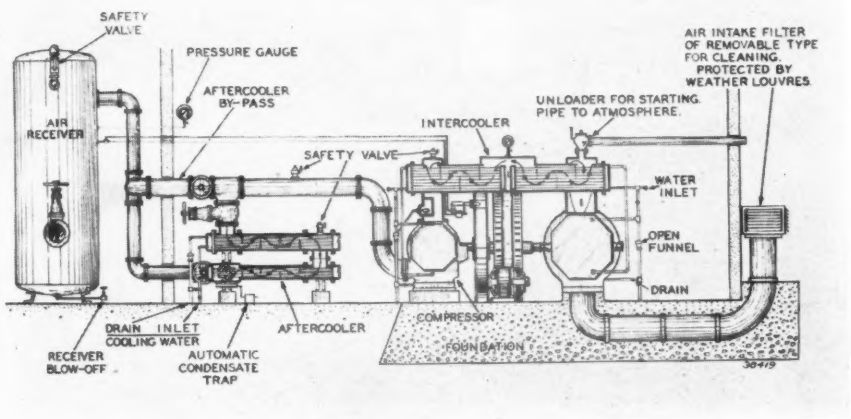


Figure 6. Sketch showing typical complete compressor-plant lay-out.

usually advisable to use a Diesel-driven compressor where the electric power is furnished by a Diesel-driven generator. The prime mover is built directly into the compressor. One does not buy a steam or gas engine or an electric motor and then buy a compressor. One buys a steam-driven compressor, an internal-combustion-engine-driven compressor, or an electrically-driven compressor. The compressor and its drive are engineered as a whole.

Accessories There are certain accessories to the compressor which should definitely receive more attention than is normally given them. These are the air-filter on the compressor intake, the aftercooler, and the air-receiver. The worth of no one of these can be accurately capitalized ahead of time but they all will rapidly return their cost.

The value of air-filters is becoming more generally recognized. Around cement mills and rock-crushing plants filters are a necessity. There are a number of types available, suitable for different applications and conditions. Accurate information on the savings due to the use of air-filters is infrequently available, but such information as has been collected indicates that they pay for themselves in three to four years. This is almost entirely due to the labor saved in maintenance and in the cleaning of valves, with reduced cylinder wear and added compressor life as bonuses.

An aftercooler is indicated on practically every job; above 15 to 25 horsepower it should be mandatory. Aftercoolers have many advantages, including the removal of a large percentage of the condensible oil and water vapors in the air, the elimination of any dangerous temperatures which might be encountered due to faulty compressor operation or the use of improper oils, the prevention of excessive expansion and contraction strains on the piping, which in time would result in leaks and loss of air, etc.

An air-receiver is mandatory on any system for the elimination of too frequent operation of control and for the reduction of wide and rapid variation in the operating pressures. It also collects moisture which may be condensed but not entirely removed in the aftercooler. One very pertinent advantage is that it reduces the pulsations in the compressor discharge materially, so that a steady flow takes place through the piping beyond the receiver. A pulsating flow in this piping will always increase the pressure drop materially and in many cases will cause such a serious condition that the compressor may be overloaded. The air-receiver should be built to conform to the requirements of the ASME Code.

One other type of compressor useful in quarrying under certain conditions is the portable gasoline- or oil-engine-driven unit. This type is well known and requires no further description. Being self-contained, it is taken directly to the job and requires the minimum amount of piping and no foundation or housing. It is particularly useful for exploration and development.

Installation So much for the various types of compressors and their accessories. The next point to be considered is the installation of this equipment. Most manufacturers have instruction books which adequately cover this for each type of machine sold. However, there are a few points worth emphasizing briefly.

Every machine and its auxiliary equipment should be so installed that there is plenty of room around it for proper maintenance and safe operation. It should, if possible, be in a well-lighted room. It must have a suitable and adequate foundation.

To start with the smaller units, particularly those which are air-cooled, under no conditions should they be placed in a room where there is no ventilation. They should not be placed in a corner. Provisions must be made for proper circulation of air around the machines. Most of

the troubles encountered with such units come from the fact that they are not properly installed and run too hot. This increases the up-keep cost and shortens their life.

Air Intake On a unit of any size, say over 15 or 25 horsepower, it is usually advisable to take the intake air from outdoors. This should be taken from just as cool a place as possible and it is essential that the air be as clean as possible. The intake should not be near any steam exhaust, or the exhaust from any ventilating fan. Get it 10 feet above ground if possible to eliminate much wind-blown dust.

It is not often realized how much is saved through the use of cool instead of hot intake air. Space is not available to discuss this in desirable detail, but 11 degrees F. reduction in the average intake-air temperature means a reduction of approximately 2 per cent. in the power required to provide a certain amount of compressed air at the air tool. It is apparent that this is well worth considering. It should be considered when planning the plant, since changes made after installation are expensive.

Piping It is needless to say that all the pipes should be as direct as possible and should connect the various accessories to the compressor as closely as possible. For an example, see Figure 6. The aftercooler should be on the inside of the building (at least in climates where freezing might take place), but the receiver should be placed outdoors as a general rule. It is usually satisfactory to put a hand-drain on the receiver, but the aftercooler should definitely be equipped with an automatic trap. The discharge of all the traps should be to some place where it can be observed, so that if it is out of order that fact will be quickly recognized.

It is important that the pipe sizes on the compressor and accessories be maintained. Small piping causes a steady power loss, which must be paid for year after year. The pipe sizes as recommended by the manufacturer are none too large. For a given quantity of air it is sometimes possible to reduce the pipe size at the receiver outlet because the flow is not pulsating but steady. However, no reduction should be made between the compressor and the receiver.

Operation A word about operation and maintenance is in order here. It may be summarized as follows:

1. Use only the best oil and then use just as little as possible.

2. Check your compressors, particularly the valves, every month or so and be sure they are tight and in good repair. Leaky valves, poor oil and too much oil are responsible for most of the air-receiver and pipe-line explosions you hear about.

3. Have a schedule for drainage of the various sections of your system to remove the water and to check trap operation, and follow it carefully.

4. Repair leaks quickly and keep your pipe-lines in good shape. A leakage test run on your complete plant might be illuminating. A guess as to the average plant leakage would be 10 per cent. of the total air compressed. One test showed 20 per cent. leaks. These tests can be run when the plant is shut down by making sure that all the normal outlets are closed but that the full piping system is under pressure. The loaded and unloaded time of one compressor can be recorded and from the full-load capacity of that compressor and the percentage of loaded time during the test the leakage can be very closely approximated.

To summarize: Select your compressor with due regard to the service expected of it and beware of putting in too small a machine.

Install stand-by capacity if warranted by the application.

Install accessory equipment which, although it increases your investment somewhat, will give a high return.

Pipe generously, planning on the future.

Trap frequently to eliminate the water, which will wear out your tools.

Fontana *(from page 62)*

Dust Collection Because of the high silica content of this material, the dust problem at these operations is important. Separate dust-collecting systems, comprising American Air Filter Company Type W wet Rotoclones, are installed at the four points where there is the greatest concentration of dust.

The discharge from the primary crushers is connected to a Number 24 Rotoclone which is rated at 10,000 c.f.m.

A Number 33 Rotoclone rated at 23,000 c.f.m. is connected to crusher building Number 1.

A Number 30 Rotoclone rated at 18,000 c.f.m. is connected to crusher building Number 2.

A Number 24 Rotoclone rated at 12,000 c.f.m. is connected to the rod-mill feed bin. The screens in the two crusher buildings are in closed rooms which are kept under suction and ducts are connected to all the conveyor and crusher discharge and feed points.

Tests have shown that these collectors are keeping dust concentrations at these points well under 5,000,000 particles per cubic foot. Water sprays are also used on all belt-conveyors carrying dry materials to keep down the dust in transit. The fans of these Rotoclones are driven through V-belts by General Electric 25-, 75-, 50-, and 30-horsepower motors in the order described.

The reclaiming tunnel under the main stock pile for raw stone is ventilated by an American Blower Company No. 5½ Sirocco fan rated at 20,400 c.f.m. The finished-material reclaiming tunnel has a 12,600-c.f.m. ventilating fan of the propellor type made by Propellair, Inc. These fans are driven through V-belts by 15-horsepower General Electric and 3-horsepower Robbins & Myers motors respectively. A home-made dust-collecting system is used in the central concrete-mixing plant.

Conveying Equipment Of the entire conveyor system, comprising 37 belt-conveyors, the part used for handling the rock is 8,694 feet long and that for handling the concrete is 2,324 feet long. All are of Barber-Greene manufacture. The conveyor belting is Goodyear "Compass Cord" and Hewitt "Circle Type." Every possible precaution is being taken to prolong the life of this belting and to protect it from injury. All the belt splices were vulcanized on the job by means of a portable Goodyear vulcanizer.

Three sets of Robins rubber-disk idlers are used at each point where rock is discharged on a belt-conveyor. As a further precaution all the chutes are curved toward the horizontal at their discharge points so that the stone flows out on the conveyor belt with almost no drop and at about the same speed as that at which the belt is traveling. This also reduces breakage of the rock in handling.

None of the rock-handling conveyors have a slope exceeding 18 degrees. All except the boom belt-conveyors are covered. Each belt-conveyor has a cleaning brush which is driven by a 1- or 1½-horsepower, 1,770-r.p.m. Westinghouse squirrel-cage electric motor.

Concrete being discharged from hopper on first of belt-conveyors which carry it to dam.

Frank Cadena, plant foreman, watching stone sand as it is being discharged from one of the mills.

Electric Motors Each of the two primary crushers is driven by a 250-horsepower, 885-r.p.m. G. E. wound-rotor motor through V-belts. Each of the two standard cone secondary crushers and each of the two short-head cone tertiary crushers is driven by a 25-horsepower, 1,165-r.p.m. Allis-Chalmers wound-rotor motor through V-belts. The drive of the two rod-mills has been described.

The two sand-drag classifiers are driven by 10- and 15-horsepower squirrel-cage motors through V-belts.

The hydroseparator is driven by a 5-horsepower, 1,160-r.p.m. squirrel-cage motor.

The 14 screens are driven through V-belts by individual 7½- or 10-horsepower G.E. or Allis-Chalmers squirrel-cage motors. All the screen motors are 1,735-r.p.m. machines except the two driving the rinsing screens which are 1,150-r.p.m.

The 36 conveyors up to the point where the concrete is split to the three conveyor systems running to the dam have motors of from 7½- to 200 horsepower and speeds of from 870 to 1,770 r.p.m. They are of various makes. Most of the conveyors are driven through speed-reducers, mostly of Jones manufacture, in combination with silent chains.

The motors used to drive all the equipment up to the dam conveyors, and not including those driving compressors, generators and other auxiliary equipment nor those in the concrete plant, are 105 in number and have a total rated horsepower of 4,561. All the motors of 75 or more horsepower are 2,200-volt wound-rotor machines and all the smaller motors are of the 440-volt squirrel-cage type. The Wagner Electric Company supplied 13 motors totalling 1,700 horsepower, the General Electric Company 19 motors totalling 1,700 horsepower, the General Electric Company 19 motors totalling 1,642½ horsepower, the Allis-Chalmers Manufacturing Company 10 motors totalling 548 horsepower, the Westinghouse Electric & Manufacturing Company 51 motors totalling 328 horsepower, and the Louis Allis Company 7 motors totalling 305 horsepower. The other motors were supplied by various other companies.

Electrical Control System The electrical system controlling these operations has all the safety and economy features now found in all modern plants. In case of the stoppage for any reason of any unit all the equipment preceding it in the flow sheet is automatically stopped. A feature is the signal system, which enables the mixing-plant operator to control the size of the aggregate being fed on the aggregate-reclaiming belt-conveyor.

Compressed Air All the compressed air for the plants and for all the other operations connected with the dam is supplied from a central compressor building. This houses three Chicago Pneumatic 3,000-c.f.m. compressors, two 3,000-c.f.m. Sullivan compressors and a 1,700-c.f.m. Sullivan compressor. The central concrete-mixing plant and the cement plant use 2,400-c.f.m. of compressed air.

Fuller's Earth Output Continues to Increase

Shipments of fuller's earth were only 2 per cent. less in 1942 than in 1941, in spite of a considerably greater reduction in oil refining activity, according to the Bureau of Mines. The mineral-oil-refining industry consumed 84 per cent. and the vegetable oils 10 per cent. of total shipments.

Texas was the leading fuller's earth producing state in 1942 with 42 per cent. of the total; the Florida-Georgia district contributed 41 and Illinois 15 per cent. The average sales realization of Texas clay was $8.38 per ton as compared with $8.70 for Illinois and $13.14 for Florida-Georgia. Quotations on fuller's earth, however, usually range from $5.50 to $16 per ton in most areas, depending on the mesh size and degree of preparation.

The Heston Certified Concrete Company of Indianapolis has set up a mobile mixing plant in Evansville, Indiana, to furnish the concrete for the construction of the new Columbia aircraft plant.

Brake Linings (*from page* 68)

it is better to replace the friction materials before there is any chance of the bolts or rivets scoring the drum or other rubbing surface.

Do not remove the band or shoes until the friction material is examined carefully to make sure that the wear is reasonably uniformly distributed all over. In band brakes and clutches, of course, there is going to be more wear at the anchored end, gradually diminishing toward the free end, so the anchored end is the section to be examined closely first. An abnormal amount of wear that is localized in some unusual section is often an indication of a loose bearing, which should be checked. Wear that is localized more often indicates a band that is out of round or running off the drum.

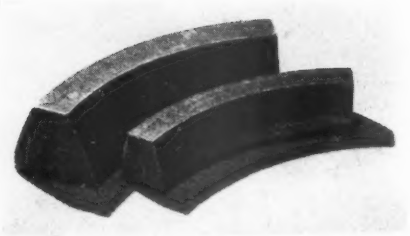
Charred and brittle friction material indicates either that the operator has been riding the clutch or

Molded industrial friction-cone facing. (Courtesy Johns-Manville Corporation.)

brake, or that a friction material of too low heat resistance or too high coefficient of friction has been used. It is possible to lower the unit pressures (with a consequent reduction of the heat generated per square inch) by changing the lever linkage, but simpler to have the operator change his methods (if he can be proved at fault), or to install new friction material of higher heat resistance.

High unit pressure, contrary to common belief, has little effect on the wear of friction material so long as safe temperatures are not exceeded. There is, however, such a thing as too light unit pressure, which occurs when drums and linings are too wide for the work they have to do. Light unit pressure may cause glazing, particularly if the coefficient of friction of the friction material is higher than is necessary. The cure for this is to reduce the area of the friction material by grooving or by using smaller blocks or narrower bands.

If the friction material has what look like little particles of steel or



Special shaped curved blocks of friction material for cone clutches. (Courtesy Johns-Manville Corporation.)

iron imbedded in its surface, examine the drum carefully for heat checking or scoring. Heat checks are the reticulated (net-like) hair cracks sometimes seen on drums. The edges of these cracks act like little file teeth. Heat checking is apparently caused by soaking heats so prolonged that the temperatures generated exceed the so-called first critical temperature of the metal against which the friction material rubs, usually over 1,000 degrees F.

Again and again it should be emphasized that heat is the chief factor in the destruction of friction materials. Heat is what disintegrates or weakens the bands and blocks so that wear can rub away the disintegrated or weakened portions. Many people have the idea that asbestos, one of the important ingredients of many friction materials, is a refractory. *It is not!* Asbestos is not a true refractory material, but a crystalline material which contains as much as 13 per cent. to 14 per cent. of chemically-combined water. At 700 degrees F. asbestos begins to disintegrate rather rapidly by giving up this combined water. Above 1,000 degrees F. disintegration is extremely rapid; while at 1,200 degrees F. asbestos reverts to an amorphous powder.

Asbestos is used in friction materials simply because manufacturers have not found anything better; not because it is the ideal material for the purpose. As a matter of fact, the life of friction material is, to a large degree, a direct function of the amount of impregnation, and varies inversely as the temperature up to 350 or 400 degrees F. Above 400 degrees F. the impregnation—rubber, synthetic rubber, coal tars, stearin pitch, drying oils, synthetic resins, precipitated calcium silicate, etc.—begins to fail. Above 500 degrees F. the asbestos begins to lose its strength.

These are some of the reasons why the designers of brakes and clutches try to keep working temperatures below 500 degrees F., although it is a practical impossibility to prevent momentary temperatures that are much higher from being generated at the contact surfaces of the friction materials and the drums or other rubbing surfaces. So long as these high temperatures are momentary, they are quickly lowered by radiation, conduction and convection, but if they are sustained and become soaking heats they are likely to become highly destructive.

When manufacturers of friction materials refer to some certain disk, cone or band as being capable of withstanding drum temperatures of 750 to 1,000 degrees F., they are talking about rigid molded materials with medium or low coefficients of friction, designed to withstand such temperatures for very brief periods, and not as soaking heats.

(*To be Concluded*)

Damage from Air Blast Investigated by Bureau

Completion of a Bureau of Mines investigation of the characteristics and destructiveness of air blasts caused by the detonation of high explosives, a problem of both peace and wartime significance about which little scientific information has existed has been announced.

The second and concluding report on *Damage from Air Blast,* prepared by Bureau scientists, the new publication presents the results of extended technical field tests conducted last year, including measurements of pressures produced in quarry blasting, measurements of high pressures from experimental shots, and observations on structural failures, particularly that of window glass.

The pressure measurements ranged from 0.0001 to 33.0 pound per square inch and the explosive charges from a half pound to 4,000 pounds of dynamite, fired under various conditions. Measurement and calibration methods outlined in the report permit dynamic pressure measurements to be made up to 100 pounds per square inch with a high degree of fidelity at frequencies as high as 30,000 cycles per second. Pressure measurements made were correlated with structural failure, the effect of reflected pressure described, and a pressure-distance curve derived which is applicable for distances of from two to 100 feet. A practical index of damage from air blast also was determined.

From quarry tests in which various types of shots were studied, it was concluded that the problem of damage from air blast is insignificant under normal operating conditions for the pressures created in blasting were insufficient to break window glass at distances just beyond the range of flying rock.

PERSONAL MENTION

JOHN O'CALLAGHAN, superintendent of the Bonner Springs, Kansas, plant of the Lone Star Cement Corporation and a veteran of the Lone Star operating organization, has been transferred to Birmingham, Alabama, as superintendent of the Lone Star plant there. ARNOLD FAIRCHILD, formerly chief chemist at Bonner Springs, has been advanced to superintendent. HOMER GRIFFITH, formerly assistant chemist, becomes chief chemist.

LEWIS DOUGHTY, formerly in the quarry business at Pawhuska, Oklahoma, is the new superintendent of the Lenapah, Oklahoma quarry and crushing plant of the Peerless Stone Company of Coffeyville, Kansas. He succeeds GEORGE ROBERTSON who was forced to resign because of ill health.

W. C. DAVIS has been appointed assistant director of sales in charge of the Export and Contractors' Section of Atlas Powder Company's explosives department. He completed 25 years' service with Atlas last year, has been manager of the Contractors' Section since 1937.

HOMER GREATHOUSE has opened a quarry and crushing plant near Winchester, Illinois.

J. E. Brunner has been made general superintendent of lime plants for the Kelley Island Lime & Transport Company, Cleveland. He first became associated with the company on July 1, 1901, at the Marblehead plant. Five years later he became superintendent of the White Rock plant at Clay Center, Ohio.

Getting the Last Ounce of Service Out of Roll Crusher Shells . . . .

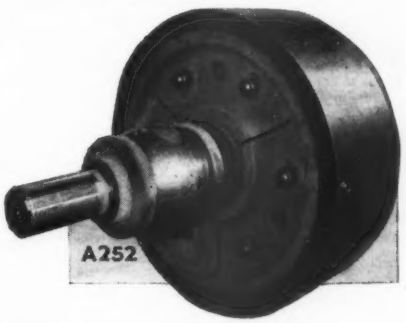
To show how long austenitic manganese steel actually lasts in crushing copper ore, we give you picture A-255 of an unused roll crusher shell, 16″ x 32″ x 3½″, weight 1,500 pounds, between two worn shells, cast from the same pattern, weighing 182 and 255 pounds each.

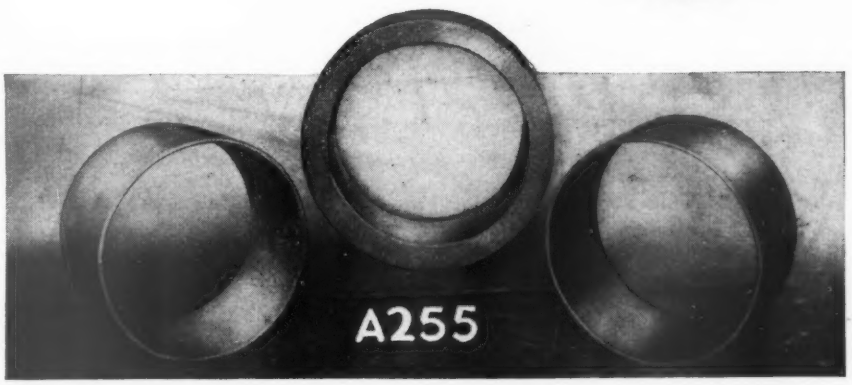
This comparison illustrates perfectly the reason for the unmatched economy of manganese steel crusher, grinding mill and pulverizer parts. The "toughest steel known" not only resists abrasive wear in a manner unsurpassed in this service, but also—by reason of its toughness—withstands breakage stresses to a high degree. These shells remained in service until well over 80% of the metal had worn away, a performance that poses the query: *"What good is an extremely hard metal if it will not withstand the shocks inseparable from crushing rock and ore?"*

View A-252 shows a mandrel fitted with an Amsco manganese steel tire, used in a double roll crusher operated with unusual success in crushing one of the hardest and most abrasive rocks in the world, known as chert or flint. This rock breaks into flakes with knifelike edges. In the "Joplin district," the valuable minerals are usually found embedded in chert, which must be broken up to release the ores. In this service, a crusher manufacturer tells us, ordinary iron or steel roll shells last only a few days, while those made of manganese steel last for many months.

For all stages of crushing—primary, secondary and fine — no other metal has been identified for jaws, rolls, mantles and concaves that is consistently as long-wearing and economical as austenitic manganese steel.

Ask for your copy of Bulletin 743-M on Manganese Steel for Mining and Quarrying Equipment, available soon.

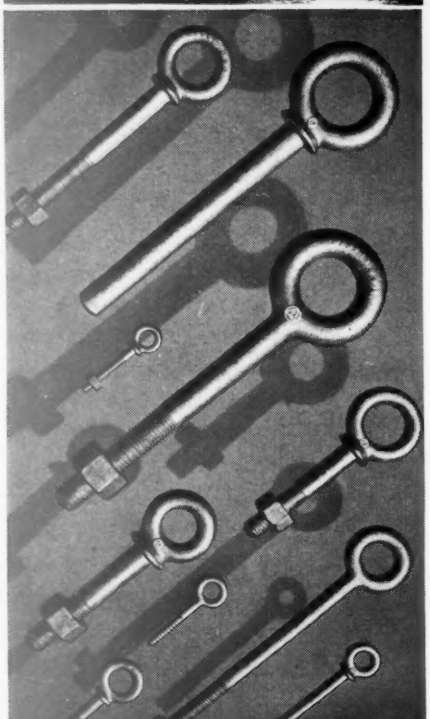




Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY

SPECIALS WASTE TIME
...TRY LAUGHLIN'S
STANDARD LINE
EYE BOLTS
FOR ALL JOBS



Keep your eye on this picture if you're thinking of having special bolts made up. Every minute counts! Laughlin standard eye bolts will likely fill the bill. All weldless — all drop forged steel. Nut type with extra length threads for extra adjustment. Send for latest Laughlin Catalog showing standard stock eye bolt sizes in nut, screw and rivet types.

Distributed through oil field supply houses
Look for Laughlin Products in Pit & Quarry Handbook

THE THOMAS LAUGHLIN Company
PORTLAND, MAINE

LOIELL HYLER, until recently chief engineer with R. G. LeTourneau, Inc., has been made assistant chief engineer of the LaPlant-Choate Manufacturing Company of Cedar Rapids, Iowa. SIDNEY L. MYERS, formerly export manager, has been advanced to vice-president in charge of export and federal sales.

Loiell Hyler

Sidney L. Myers

C. N. GUERASIMOFF, formerly assistant chief engineer, has been appointed chief engineer of the Engine Division of the Buda Company, Harvey, Illinois.

FORREST T. BROWN, Kansas City district sales manager for the Lehigh Portland Cement Company, is serving as head of the Missouri Citizens' Postwar Construction Council, whose main objective is to assist smaller communities throughout Missouri in preparing to share federal public-works grants which may come following the war.

H. S. MATTIMORE, formerly engineer of materials, Pennsylvania State Highway Department, Harrisburg, Pennsylvania, is at present serving as senior civil engineer, Civil Engineering Corps, U. S. Navy. He is stationed at Wilmington, North Carolina.

W. F. STEWART has been made assistant sales manager of the hardware-products division of the Wickwire Spencer Steel Company. He has been with the company since 1923.

AVERILL B. PFEIFER, comptroller of the Medusa Portland Cement Company, Cleveland, has been elected commander of Clifton Post, American Legion, in Cleveland.

JOHN EASTON has been appointed director of the development and standardization activities of the Whiting Corporation, succeeding A. J. Brown who has been transferred to California to be manager of the Pacific Coast branch.

OBITUARY

W. L. MCGAUGHEY, 57, general foreman of the gravel plant of the American Materials Corporation at New Miami, Ohio, was electrocuted August 26 when a crane on which he was standing came in contact with a high-tension wire. His widow and a daughter, survive.

JOSEPH J. QUINN, 65, foreman for the Ingalls Stone Company at Bedford, Indiana, for many years, died August 24 in an Indianapolis hospital.

HAL WILLIAMSON HARDINGE, 87, inventor, consulting mining engineer and chairman of the board of the Hardinge Company, Inc., of York, Pennsylvania, died last month in his home after a long illness. He was the inventor of the Hardinge conical mill for grinding ores, the reverse air separator and many other devices. In 1938 the American Institute of Mining and Metallurgical Engineers awarded to him the James Douglas Medal "for his inventions and apparatus for fine-grinding of ores." He had previously won the John Scott Medal of the City of Philadelphia and the Longstreet Medal of Franklin Institute.

FRED A. DABOLL, 70, advertising manager for the Warner Company, Philadelphia, is dead after an illness of several months. He joined the company in 1899 as sales manager, was made general sales manager in 1908. Resigning in 1926 to go into business for himself in Georgia, he returned in 1930 to become advertising manager, which position he held until his death.

J. HARRY MUIR, 58, office manager for the Prescott Sand & Gravel Company, Prescott, Arizona, passed away in August after an illness of five weeks. Burial took place in Lexington, Kentucky, his former home.

EDGAR JAMES, 62, who was associated with the Ohio River Sand & Gravel Company at Louisville, died July 22 at his home in that city. The widow, a son and two daughters survive.

The Hercules Powder Company has announced the establishment of a sales-research division to investigate new markets for Hercules chemical products and to study the needs of industries served by the chemical company. Dr. John H. Long will be in charge of the new division.

TRAFFIC News Digest

I. C. C. Reports

Granite.—Docket No. 28835.—Lloyd Brothers Company *et al. v.* Grand Trunk Western *et al.* By the Commission. Report by Commissioner Splawn. Rates charged on polished, dressed, and rough granite, in carloads. Shipped between January 1, 1937, and September 3, 1940, inclusive, from Barre, Hardwick, and Montpelier, Vermont, to Detroit, Michigan, of 28, 35, and 44 cents prior to March 28, 1938, and 31, 39, and 48 cents on and after that date, applicable except in one instance. The report stated that the 39-cent rate assailed on dressed granite from April 30, 1938 to September 3, 1940 inclusive was inapplicable, and that the applicable rate in that period from origins to destinations was 38 cents which was the column 27.5 rate. Reparation with interest, awarded in that instance. The report stated that any departures from the long-and-short-haul part of the fourth section were duly authorized.

Phosphate Rock. — Docket No. 28960.—Diamond Fertilizer *et al. v.* Aberdeen & Rockfish *et al.*, embracing Sub. 1, American Agricultural Chemical Company *v.* same. By Examiner John A. Russell. Rates on phosphate rock, crude, ground and unground, from Florida to destinations in Illinois, Indiana, Michigan and Ohio, unreasonable to the extent that they exceed rates 20 per cent. lower than the rates on superphosphate, fertilizer, and under other fertilizer materials authorized in Fertilizer Between Official and Southern territories, 232 I. C. C. 301. Reparation with interest, proposed. According to the report, the issue requiring determination in this proceeding was whether the rates on phosphate rock were properly related to those on other commodities. The conclusion was reached that the rates should be lower than the rate on superphosphate and other processed fertilizer materials; however, it was brought out that phosphate rock was lower-grade traffic than fertilizer.

Truck Reports

Moliterno Brothers, Inc. of New York City has obtained authority from the OPA to sell and deliver motor contract carrier services to the National Gypsum Company on and after May 27, 1943 at rates not to exceed those set forth in schedules added to its application for adjustment of rates and identified as supplement No. 1, to M F-I. C. C. No. 5, issued April 14, 1943 and effective May 27.

The OPA has also authorized the Gerosa Haulage & Warehouse Corporation of New York City to sell and deliver contract carrier services to the National Gypsum Company on and after May 27, 1943, at rates not to exceed those set forth in schedules added to its application for adjustment of rates and identified as supplements Nos. 1, 2, and 3 to M F-I. C. C. No. 6, effective May 27.

Long Island City.—M C 104438, Anthony Karp, contract carrier. Permit proposed. Brick and ash block, between Long Island City, New York, on the one hand, and, on the other, points in New Jersey, New York, and Connecticut, within 50 miles of Columbus Circle, New York City, over irregular routes.

New Cars Authorized by ODT

The Office of Defense Transpor-

4 REASONS *why* *TDA

was used in over 30,000,000 barrels of cement in 1942.

1. **TDA increased production from 15% to 60%, depending upon the grinding circuit, characteristics of the clinker, and type of cement ground.**
2. **TDA gave appreciable savings in grinding media and power.**
3. **TDA has no *adverse* effect on *any* of the properties of portland cement.**
4. **When used in amounts greater than those generally recommended for grinding aid purposes, TDA noticeably improves many of the desirable properties of portland cement concrete.**

TDA is not offered as a cure-all, but it may help you solve your grinding problems. TDA, with a ten-year record of successful and constantly growing acceptance, is now used in sixty-eight cement plants, a record which invites your consideration. **— Dewey and Almy Chemical Company, Cambridge, Massachusetts.**

★

***TDA—the Dewey and Almy Chemical Company's trademarked name for its catalyst, dispersing agent, grinding aid used in the manufacture of portland cement.**

tation has found it possible to provide for the construction of 5,801 additional new freight cars in 1943 out of steel allocated to the railroad industry for the third quarter. The addition of the 5,801 new cars to the approximately 26,000 already authorized will mean that upwards of 32,000 new freight cars will be produced this year, ODT officials declared. The breakdown of the 5,801 cars according to type is as follows: Box, 2,724; gondola, 262; hopper, 2,150; refrigerator, 300; flat, 365.

Central Freight Association

Docket 74053 (Shipper's proposal).—Limestone, ground or pulverized, unburned. Carload. Minimum weight 60,000 pounds. Establish a rate of $2.48 per net ton from Marlo, Mosher, and Ste. Genevieve, Missouri, to Kokomo, Indiana. Kokomo is to be added to page 203 of C. F. A. L. Tariff 400-Q, Item 2915, *via* Routes 9178, 9181, 9194, 9201, 9216 and 9232.

Docket 74063 (Shipper's proposal).—Lime, common, hydrated, quick or slaked. Carload. Establish a rate of 18 cents minimum weight 30,000 pounds and 14 cents minimum weight 50,000 pounds from Port Huron, Michigan, to Warren, Ohio.

Docket 74074 (Shipper's proposal).—Barytes, black ash of barium sulphide ash. Carload. Minimum weight 40,000 pounds. Establish a rate of 35 cents from Chicago, Illinois, to North Claymont, Delaware.

Docket 74075 (Shipper's proposal).—Lime, common, hydrated, quick or slaked. Carload. Establish a rate of 18 cents minimum weight 30,000 pounds and 14 cents minimum weight 50,000 pounds from Port Huron, Michigan, to Kokomo, Indiana.

Docket 74095 (Carrier's proposal).—Cement, common, hydraulic, masonry, mortar, natural or Portland, and cement clinker. Carload. Minimum weight 50,000 pounds. Cancel present commodity rates from Chicago, Illinois, to points in C. F. A. territory east of the Indiana-Illinois state line. Class rates or intermediate rates to apply in place thereof.

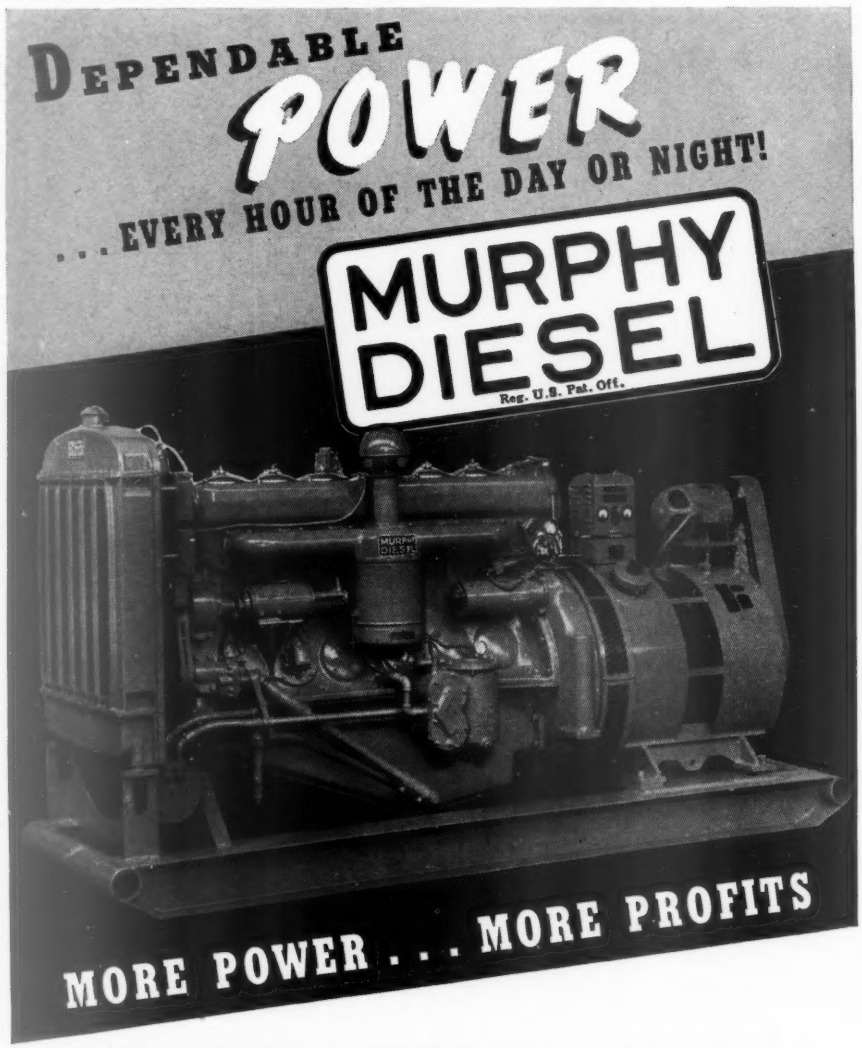
Docket 74123 (Shipper's proposal).—Agricultural limestone, unburned, not ground or pulverized, in open-top cars. Carload. Establish a rate of $1.38 per net ton from Marble Cliff, Ohio, to Kolmont and Smithfield, Ohio. *Via* P. R. R.-Bowerston-W. & L. E.-Pittsburgh Junction-P. & W. V. A.

Docket 74120 (Shipper's proposal).—Magnesite. Carload. Minimum weight 80,000 pounds. Establish on, from points in C. F. A. territory to points in S. F. A. Territory, Class 12 (17½ per cent. of first class).

Docket 74163 (Carrier's proposal).—Crushed stone, carload. In bulk, in open-top cars. Establish a rate of $2.15 per net ton from Calcite, Michigan, to Chicago, Illinois.

Docket 74164 (Shipper's proposal).—Dolomite, roasted, refractory dolomite in granular form, treated or untreated, clinkered, or burned to a dead state. Carload. Minimum weight 90 per cent. of the marked capacity of car, etc. Establish a rate of $3.91 per net ton from Durbin, Ohio, to Schenectady and Troy, New York.

Docket 74166 (Shipper's proposal).—Sand, all kinds, and gravel, in open-top cars. Carload. Establish a rate of 77 cents per net ton from Lorain, Ohio, to North Eaton, Ohio, *via* B. & O.-Grafton, Ohio-N. Y. C. (C).



Built for continuous heavy-duty service — rugged, compact, simple to operate—Murphy Diesel Generator Sets provide real operating economy and many years of reliable performance.

Available in sizes 55 to 115 K.W., AC or DC; engines in sizes 85 to 200 HP. Write for complete information.

MURPHY DIESEL COMPANY

5307 WEST BURNHAM STREET MILWAUKEE, WISCONSIN

Docket 74181 (Shipper's proposal).—Limestone, ground or pulverized. Carload. Minimum weight 60,000 pounds. Establish on, from Branchton and Osborn, Pennsylvania, to Cameron, West Virginia, $1.87 and to Hundred, West Virginia, $1.93 per net ton. *Via* B. & L. E. - Bessemer, Pennsylvania - B. & O.

Docket 74209 (Shipper's proposal).—Stone, rip rap. Carload. Minimum weight 90 per cent. of the marked capacity of the car except that when it is loaded to its full cubical or visible capacity, the actual weight will apply. Establish a rate of $1.24 per net ton from Machias, New York, to Buffalo, New York, and a rate of $2.08 to Erie, Pennsylvania.

Docket 74220 (Shipper's proposal).—Crushed stone or crushed-stone screenings, in bulk, in open-top cars. Carload. Establish a rate of $1.16 per net ton from Carey, Ohio, to New Carlisle, Ohio, *via* N. Y. C. (C) direct.

Legal Decisions

By LEO T. PARKER

●

Seller Forfeits Right

Modern higher courts consistently hold that a person who sells materials to a municipality is bound to know that the city officials or commissioners, who make the original contract of purchase, have proper and legal authority to make the contract, otherwise the seller may forfeit his right to recover payment for the furnished material although the city officials used it to the benefit of the city. The same law is effective with respect to liens. The failure of a seller to supply material to either a contractor or a municipal purchasing board having proper and legal authority to purchase the material is likely to result in a forfeiture of a lien to secure payment for the furnished materials. And, furthermore, if the contract under which a contractor sells materials to a municipality is not of the "lien type" the seller automatically forfeits his rights to a first lien.

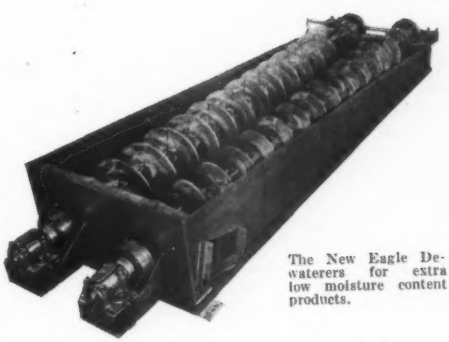
For example, in *Ozaukee Sand & Gravel Company v. City of Milwaukee*, 9 N. W. (2d) 99, it was shown that a Wisconsin state law provides that all moneys paid or becoming due to a principal contractor for "public improvements" shall constitute a trust fund for the benefit of materialmen and laborers. A contractor and a municipality entered into a contract for the sale of sand and gravel to the city. The contract was made with the Central Board of Purchases. Litigation developed over the question whether the seller, who supplied the material to the contractor, was entitled to a preference over a creditor of the contractor holding an assignment of the funds due from city. Although the sand and gravel were used for incidental maintenance and repairs, the higher court held that the Central Board of Purchases was not authorized by valid laws to make purchases for public works. Therefore, the court refused to hold in favor of the seller of the materials.

Contracts Silicosis

Modern higher courts hold that all employers must comply with valid laws designed to protect their employees from contracting silicosis. On the other hand, an employer will not be held liable in damages for the sickness or death of an employee because he fails to comply with a law whose actual effect is *not* to prevent

And — clean aggregates plus retention of fines and greater moisture control are guaranteed through the use of Eagle products.

In nearly all recent concrete construction the above have proven to be most important in the manufacture of good concrete. This indicates more stringent aggregate specifications in post-war construction. Eagle pioneered the way to meet this situation.



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contraction of this disease by the employee.

For example, in *Peerless Manufacturing Corporation v. Mackey,* 171 S. W. (2d) 258, it was shown that the dependents of a deceased employee sued his employer to recover $37,381.20 as damages. It was alleged that the death was due to the negligence of the employer in failing to provide the decedent with a safe place in which to perform his work, and failing to provide him with proper equipment to protect him from inhaling silica-sand dust and particles, whereby he contracted the disease of silicosis, which culminated in his death. The alleged failures and neglect of the employer with reference to the safe place for the decedent to perform his work consisted chiefly in not providing a sufficiently ventilated room within which he worked and *also* a hood or helmet. The lower court held the employer fully liable in damages. The employer appealed to the higher court.

An important point of law involved in this case is that the lower court instructed the jury that it was the duty of the employer to furnish "a room that was properly ventilated in which to do the work" he was performing and also "to furnish him with a helmet, mask and hood sufficient to protect the plaintiff's decedent from inhaling silica dust," and if he failed to perform either of such duties the law was for the employee and the jury should hold the employer liable. The higher court reversed the lower court's verdit on the ground that an employer is not required to comply with laws that do not protect employees from contracting a disease. The higher court said:

"It will be perceived that the defendant (employer) was required to furnish a properly ventilated room in which the decedent performed his work, and to furnish—in addition to the respirator,—a hood to protect him from inhaling silica dust, neither of which requirements, according to the undisputed proof, performed any protecting functions from such inhaling. On the contrary the proof indisputably reveals that the ventilation of the room where the deceased worked neither could nor did dispel from the room the poisonous dust, nor did the hood contribute in any manner to its elimination, since its function was only to protect the top of the decedent's head, shoulders and body from flying sand resulting from the work being performed."

Fails to Repair Machine

Modern higher courts consistently hold that an employer who promises to repair defective machinery and fails to do so is liable in damages for injuries subsequently sustained by his employees. For example, in *Nason v. Lord Company,* 29 Atl. (2d) 464, it was shown that an employee was injured while operating a machine. The essential parts of this machine were the "plate" and the feed rolls. The testimony proved that about a week before the accident the employee notified the superintendent that the feed rolls on four of his machines required repairs, and received a promise that new rolls would be substituted. However, the superintendent failed to make the repairs resulting in injury to the employee. In holding the employee entitled to a recovery of damages, the higher court said:

"The promise of a master to remedy defects or deficiencies in his instrumentalities relieves the servant of his implied assumption of the risk while he remains at work on the strength of the promise."

Compensation Insurance

Failure of an employer to pay insurance to the State Workmen's Industrial Insurance fund always results in increased liability of such employer. For illustration, in *Kamp*

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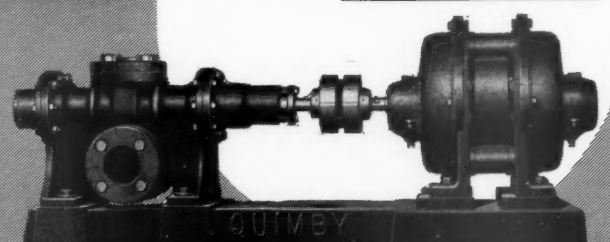

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v. Disney, 135 Pac. (2d) 1019, it was shown that an employee sustained an injury while helping load materials on a truck. The employer did not carry Workmen's Compensation Insurance as required by a state law. Therefore, the higher court held the employer liable for payment of a heavy penalty, and said:

"The apparently harsh order of the commission for compensation was due largely to the penalty of 50 per cent. imposed under the statute for failure to carry compensation insurance. Courts have no discretion in the imposition of this."

Recovers Extra Payments

Considerable discussion has arisen from time to time over the legal right of an excavation contractor to recover extra payments where the plans and specifications, on which he based his bid, are defective and do not clearly indicate the exact soil conditions. The contractor may, under these conditions, recover for extra work and expense although the owner advises and instructs the contractor to visit the proposed site and decide for himself the condition of the subsoil. For example, in *Hersey Gravel Company v. State,* 9 N. W. (2d) 567, it was shown that the state of Michigan advertised for bids for the construction of 5.17 miles of highway. A contractor obtained plans and specifications from the highway department and spent two days examining the proposed right of way and "borrow pits". The blueprints which he examined contain notations of soil conditions upon which he based his bid. This bid in the sum of $266,324.19, being the lowest of those tendered, was accepted, and a contract was executed covering the project. The contract called for 373,086 cubic yards of earth excavation and 17,007 cubic yards of rock excavation, but an extra construction estimate shows that the contractor completed an additional 32,175 cubic yards of earth excavation and 11,390.08 cubic yards of rock excavation. He sued the state to recover additional compensation on the contention that if the material to be encountered had been of the character indicated by the drawings and as represented directly or impliedly, he could have completed the work at the contract price and would have earned a reasonable profit. By reason of the fact that the material actually encountered was not the kind indicated in the drawings and directly and impliedly represented to be, but of a kind vastly more difficult and expensive to move as above set forth, the cost of completing the work of the contract was $59,622.27 in excess of the cost anticipated. The contractor asked the court to compel the state to pay him this additional amount.

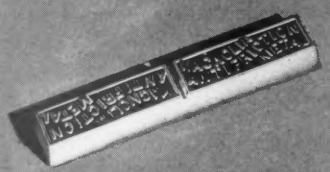
In holding the contractor entitled to recover additional payment, the court held that where the provisions in blueprints prepared by the state in seeking bids for the construction work showed subsoil conditions, a provision in the specifications supplementing the blueprints that soil notations was for information only and should not be construed to relieve bidders of their responsibility to satisfy themselves by examining the site of the proposed work *did not preclude the contractor* from recovering for misrepresentations as to actual soil conditions.

Also, see the leading United States Supreme Court case of *States v. Spearin,* 248 U. S. 132. In this case the court held that the direction and advice to contractors to visit the site and inform themselves of the actual conditions of a proposed undertaking will *not* relieve the owner or state from defects in the plans and specifications.

Carrier Liable

Occasionally both the owner of goods and a private carrier are con-

THREE MAGNOLIA BEARING METALS FOR THE *tough* JOBS



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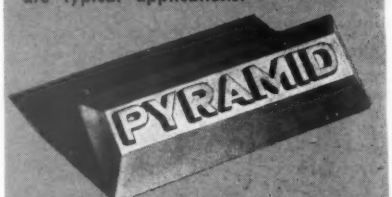

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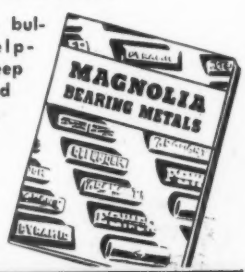

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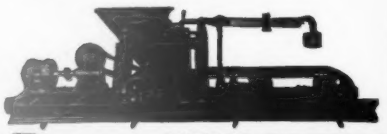
PROPORTION BY WEIGHT



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tributorily negligent resulting in the loss of merchandise.

For example, in Producers Company v. Douglas Corporation, 48 F. Supp. 16, it was shown that an employee was hired by both a carrier and the buyer of a cargo of kerosene. A fire started because the carrier's employee was guilty of negligence in failing to insulate the exhaust pipe of the engine. In other words, legally both the owner of the transported merchandise and the carrier were negligent.

The question presented the court was: For what if any, part of the value of the merchandise is the carrier liable? The court held the carrier liable for two-thirds of the full value of the destroyed goods.

No Lien of Public Funds

All higher courts are in accord with the rule of law that irrespective of debts owed by a contractor, architect, or engineer, the creditor can not by garnishment proceeding secure money due from a municipality. This is so because "public policy" demands that a fund set apart for public construction work must not be taken by garnishment for the debt during the process of construction, since that may prevent the completion of the work.

For example, in *Holston Union National Bank p. Knox County,* 165 S. W. (2d) 382, it was shown that a creditor filed a garnishment suit of this nature. The higher court said:

"It is plainly to be seen that the old rule exempting counties and municipalities from garnishment has not been entirely abrogated. It is still upheld as a sound rule where the seizure by garnishment of a contractor's funds might prove an embarrassment to the public."

However, this law must not be confused with laws pertaining to bonds. In other words, modern higher courts hold that a bond given by a construction contractor to a municipality or state to secure payment of all just claims for material, lubricants, oil, and gasoline, used or consumed in construction of the work and for payment of all laborers and mechanics for all labor performed is for the benefit of all those furnishing labor and materials in performance of the contract.

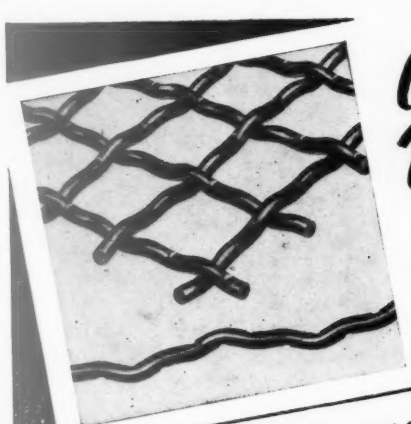
For example, in *Peter Kiewit Sons' Company v. National Casualty Company,* 8 N. W. (2d) 192, it was disclosed that a contractor furnished a bond guaranteeing payment for all materials, labor, etc. used on a public construction job for the state. In holding the bond valid, the court said:

"The bond does not require that the supplies enter into and become a part of the construction, as is generally the case in mechanics' liens, but only that they be used or employed on said contract."

Driving on Left Side

Many drivers of motor vehicles are under the false belief that, when an automobile is driven on the left side of a highway or street, the driver assumes full responsibility for accidents. However, this is not true.

For example, in *Standards Materials Corporation v. Johnson,* 169 S. W. (2d) 590, it was shown that the Standard Materials Corporation's loaded gravel truck sideswiped or was sideswiped by passenger automobile. The driver of the passenger automobile was driving behind an empty truck that was stopped suddenly. He claimed that after passing the parked truck he returned to the right side of the highway and was 30 or 40 feet beyond the stationary vehicle when the gravel truck sideswiped his car. His left arm was badly injured, necessitating amputation. Other witnesses substantiated the injured driver's version of how the collision occurred. Therefore, the higher court held the Standard Materials Corporation liable in heavy damages of $10,000, and said:



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"The judgment for $10,000 is not excessive for the loss of an arm and for being subjected to the pain plaintiff is shown to have endured."

This court further explained that the driver of the gravel truck should have observed, by using ordinary care, that the driver of the passenger automobile was compelled to swerve to the left side of the highway to avoid collision with the stalled truck and that he should have stopped or pulled to his right to avoid the collision.

Legal Employee

If a person is hired to perform labor or services, and the employer has no right of control, such person is an independent contractor. Moreover, the employer is not required to pay compensation, industrial or social-security insurance on this employee. On the other hand, if the employer has the right to control the acts of the employee, the legal relationship of employer and employee exists.

For instance, in *Heatherby v. Michigan Motor,* 8 N. W. (2d) 75, it was shown that a motor-truck owner was hired to use his truck to make daily deliveries of materials for a company. He was paid weekly wages and truck rental and worked exclusively for the company and handled no other freight. One day the truck owner was killed while operating his truck. The legal question presented the higher court was: Was the truck owner a legal employee or an independent contractor? In holding that the truck owner was an employee and, therefore, within the State Compensation Law, the court said:

"The test of whether a relationship is that of an employee or independent contractor is the right to control rather than the actual exercise of control."

Sales-Tax Law Construed

It is now fully recognized by modern higher courts that interstate business must pay its way. In other words, it was not the purpose of the commerce clause to relieve those engaged in interstate commerce of their just share of state tax burdens, merely because of an incidental or consequential effect of the tax as an increase in the cost of doing the business.

For example, in *Morrison-Knudson Company, Inc. v. State Board of Equalization,* 135 Pac. (2d) 927, it was shown that a corporation sold nonmetallic-mineral products f.o.b. the seller's location. These products were sold and shipped to purchasers located outside the state. In holding the seller liable for payment to the state of sales tax, the higher court said:

Sales to purchasers in another state are not withdrawn from federal control because the goods are delivered f.o.b. at stated points within the state of origin for transportation. . . . In cases involving such taxes the court must take into consideration not only the commerce clause of the United States Constitution, Article 1, 8, Clause 3, but also the power of the state to tax for the purpose of continuing its existence . . . While the purchasers in other states in most instances of course contemplated that the goods should be shipped by interstate carrier, that mere fact did not withdraw the property from the state's power to tax it."

Also, see *Blind Bull Company,* 101 P. (2d) 70. In that case sales of mineral products were made in the state to purchasers who hauled the products into another state for use or consumption. The higher court held that the sales were not exempt from the sales tax imposed in the state and did not interfere with interstate commerce.

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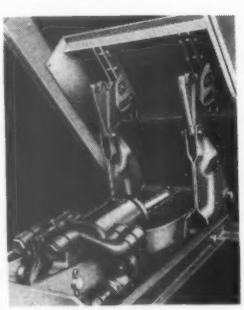

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Must Comply with Law

Many states require foreign corporations, and others who "do business" in the state to obtain a license. Failure to do so results in forfeiture of the company's right to maintain or file suits in this state.

For illustration, in *Cohn Company v. Feinberg,* 8 N. W. (2d) 825, it was shown that a company sold goods to a purchaser in the state of Minnesota. The company had its principal office outside the state, but maintained offices in the city and was represented therein by an agent employed on a commission basis. The company's name was printed on the door of such office, and its name, address, and telephone number were carried in the Minneapolis telephone directory. A stenographer was regularly employed in the office. All charges for rent, telephone, and wages were paid by the company.

A Minnesota state law requires foreign corporations maintaining offices in Minnesota, and conducting a substantial business in the state, to obtain a license. This company failed to obtain a license in the state and when it sued the purchaser to recover money due, the higher court held the suit invalid. Therefore, the seller could not collect the money due from the purchaser.

Questions and Answers

[Mr. Parker will be glad to answer questions regarding legal problems of PIT AND QUARRY readers. Questions should be addressed to Leo T. Parker, Legal Editor, PIT AND QUARRY.—ED.]

Legal Editor: Under what circumstances are we liable in damages where a patron falls and sustains an injury on our premises?—M. C.

Answer:—Modern higher courts hold the owner of premises owes to customers the duty to maintain the premises in a reasonably safe condition. On the other hand, the customers must use ordinary care to protect themselves against injuries. If they are familiar with the premises usually the higher courts will not allow damages. But if the condition of the premises is such that danger may result to the average person, the owner of the property will be held liable.

For example, in *Cartier v. F. M. Corporation,* 29 Atl. (2d) 423, reported January, 1942, it was shown that a customer was seriously injured when he slipped and fell, sustaining severe injuries. He sued the company for damages and proved that the tread at the edge of the floor was so worn as to make its condition one of danger. The counsel for the company argued that the injured person was not entitled to damages because he was familiar with the premises and had used the stairway. However, notwithstanding this argument, in holding the patron entitled to a recovery of damages, the court said:

"While some wear of stair treads is to be expected and creates no demand for repair, the point at which the wear has become so great as to make the stairs unduly hazardous is one of fact, and the evidence, quoted tended to show that the danger point had been passed." Therefore, in cases of this kind the important consideration for the jury is whether or not the premises were reasonably safe, and whether the customer could have avoided the injury by using ordinary care.

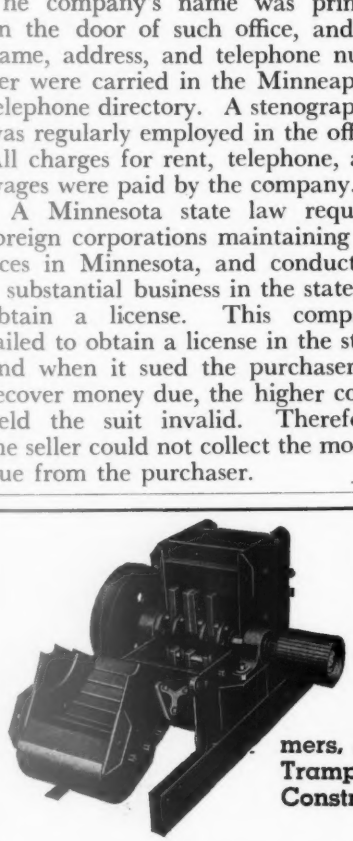
* * *

Legal Editor: Mr. Blank, a citizen of a foreign country who lives in the United States, applied for and was granted a patent in the United States. He used a fictitious name which he had adopted himself without having it changed by either the country he came from or this country; he has since become naturalized under the assumed name. Two men helped him financially and were assigned one-third interest in the patent. Is the patent void on account of Blank's using a fictitious name when obtaining it? Also, can a person, or firm, make and use for himself a patented device without infringing the patent?—W. C.

Answer: On page 8, Section 24, of the Rules of Practice of the United States Patent Office is found the following: "A patent may be obtained by *any* person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country before his invention or discovery thereof."

In case of the death of the inventor, the application will be made by, and the patent will issue to, his executor or administrator. In that case the oath will be made by the executor or administrator.

In case an inventor becomes insane, the application may be made by, and the patent issued to, his legally appointed guardian, conservator, or representative. The application and oath must be signed by



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the actual inventor, if alive, even if the patent is to issue to an assignee (see rules 30, 40); if the inventor be dead, the application may be made by the executor or administrator.

Section 46 provides: "The applicant, if the inventor, must make oath or affirmation of what country he is a citizen and where he resides, and whether he is a sole or joint inventor of the invention claimed in his application."

Therefore, it is quite apparent that it is not necessary under all circumstances that the inventor himself make the oath in order that a patent shall be issued. Moreover, the rules apparently do not specifically require that the oath shall be made in the name of the inventor.

The fact that a person signs an assumed name does not relieve him from liability on a contract. For these reasons it is my opinion that a patent would not be invalid on the ground that the application and oath were made by the actual inventor in the proper manner under an assumed name.

No person may without liability for infringement make, sell or use a patented device, unless he is properly authorized to do so. The "hearsay" information that any one may make or use a patented device without liability is, therefore, false and unreliable.

Trade Literature

SYNTRON VIBRATORY MATERIAL HANDLING EQUIPMENT. (4 pages, Catalog 435), Syntron Company, Homer City, Pennsylvania.

HARD-FACING MAKES YOUR EQUIPMENT LAST LONGER. (12 pages), Coast Metals, Inc., Canton, Ohio.

MANGANESE STEEL FOR APRON FEEDERS. (24 pages, Bulletin 643-AF), American Brake Shoe Company, Chicago Heights, Illinois.

CINDER CRUSHING MACHINERY WITH PLUS VALUE. (8 pages), New Holland Machine Company, New Holland, Pennsylvania.

THE HARDINGE CONSTANT-WEIGHT FEEDER DID ALL THIS . . . and More. (4 pages), Hardinge Company, York, Pennsylvania.

FORTY YEARS OF PROGRESS. (42 pages), Ideal Electric & Manufacturing Company, Mansfield, Ohio.

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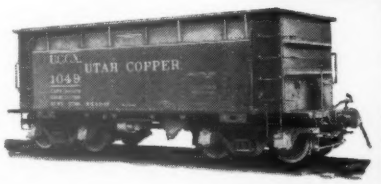

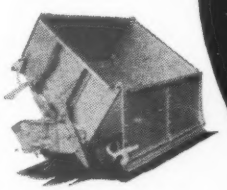

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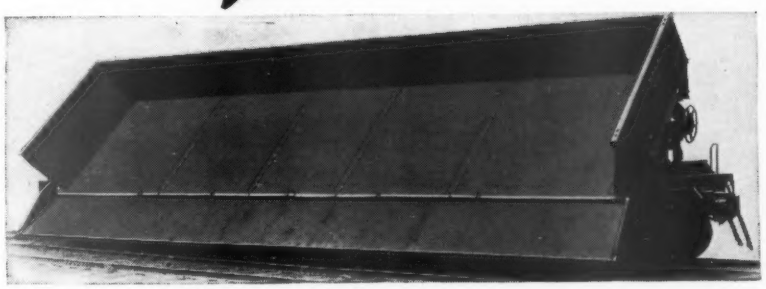

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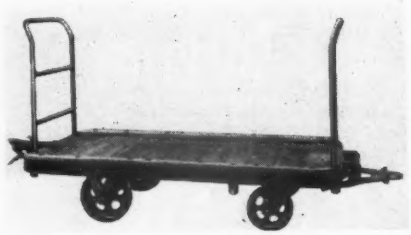
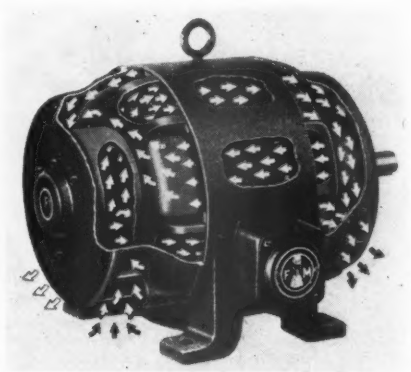


New, all-purpose industrial trailer Model 610 announced by the Rose Manufacturing Company, Detroit. Automatic hitch is standard, although the manually operated type may be furnished as optional equipment. Racks are interchangeable on sides or ends. Diameter of caster wheels is 10 inches with a 3-inch face; rear wheels 12 inches with a 3½-inch face.

Regardless of the position of the motor, complete safety for the operator is assured because there are no moving external parts. The frame is cast in one piece with rib sections to give added strength without increase in weight.

The new motor also incorporates an innovation in conduit boxes. Where space is limited, the conduit can be brought up between the motor feet to the tapped hole in the motor frame and the conduit box cover assembled flush



Squirrel-cage motor showing path of cross-flow ventilation.

with the frame. The external box is then discarded. When the conventional conduit box is used it can be mounted in any one of four positions.

It is rated 40 degrees C. and designed to carry 115 per cent. load continuously without injurious heating (1.15 per cent. service factor).

RECENT PATENTS

Grinding mill. William F. Heller, Manhasset, N.Y. No. 2,324,502.

Removable counterweight for excavating and load-handling machines. Roy H. Zailman, Lorain, Ohio, assignor to Thew Shovel Co., same place. No. 2,325,089.

Toggle for crushers. Edward T. Peterson, Reading, Pa. No. 2,325,195.

Excavator. Victor Mikan, Durand, Mich. No. 2,325,336.

Reduction crusher. Herbert Turner, Jr., Boscobel, Wis. No. 2,325,719.

Bucket-tooth unit. Marshall J. White, Marysville, Calif. No. 2,325,991.

Jaw crusher. Oscar C. Gruender, Milwaukee, Wis., assignor to Nordberg Mfg. Co., same place. No. 2,326,215.

Crusher. Raymond E. Browning, Verdun, P.Q., Canada. No. 2,326,750.

TRADE NOTES

Recent recipients of the Army-Navy "E" award for outstanding production achievement were the Dewey & Almy Chemical Company of Cambridge, Massachusetts, and the Cleveland Tractor Company, Cleveland.

On leave of absence for the past year in performance of a special assignment for one of the country's largest motor freight lines, Tom Collins has rejoined the Cummins Engine Company, manufacturers of Cummins Diesels, in his former capacity of manager of the company's Pacific Southern Region.

The Wickwire Spencer Steel Company has announced the appointment of T. H. McSheehy as sales manager, wire rope division. In his new capacity, he will supervise wire-rope sales throughout the country. J. A. Old, who has been with the company a number of years, succeeds Mr. McSheehy as Pacific Coast Sales Manager.

The C. O. Bartlett & Snow Company, Cleveland, has appointed Martell & Ferree, Philadelphia, as its sales representative in the Philadelphia territory, comprising the state of Delaware, southern New Jersey and eastern Pennsylvania.

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first in our field to win the Army-Navy "E" award and the Treasury Bullseye flag—signal honors that make us humbly aware of our responsibilities.

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The CONCRETE MANUFACTURER

OCTOBER, 1943

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Properties of Concrete Made with Various Types of Cement

A knowledge of the tensile strength of concrete is important in studying failures of this material as the result of shrinkage, temperature variation, or other factors that may cause disruption. An improved tensile test method developed at the Bureau of Standards by Louis Schuman and John Tucker, Jr., employs cylindrical specimens, 4 by 16 inches. Loads are applied through threaded rods embedded in a rich mortar at the ends of the specimens.

Compressive and tensile strengths have been determined for concretes made with a number of cements of various types, including five normal, four moderate-heat, and three high-early-strength Portland cements; two Portland-pozzuolan; one high alumina cement; and nine cements containing aerating agents. This last type has been used to reduce the disruptive effects of freezing and thawing. Stress-strain determinations in both tension and compression have also been made on the aerated concretes and on one normal concrete. The effect of varying sand-gravel ratio and of various coarse aggregates on tensile strengths were also studied.

According to the report on this work in the August *Journal of Research*, cements of the moderate-heat type, often used in large structures to prevent undue temperature rise, gave but slightly lower compressive and tensile strengths at early ages than normal Portland cements. At later ages the strengths of these cements, both in tension and compression, often exceeded other types. The high-early-strength cements gave appreciably higher strengths at early ages than the other types of cement. The use of either a high-early-strength cement, or of a richer mix with a normal cement, appears to have greater advantage in securing high early tensile strength than high early compressive strength.

Aerated concretes were relatively high in tensile strength up to seven days; thereafter both compressive and tensile strengths, as well as moduli of elasticity, were lower than for normal cements.

With some cements, tensile strength attained maximum values between seven days and three months. Tensile strengths were related to compressive strengths. For the same cement, tensile strengths varied greatly with sand-gravel ratio and the type of coarse aggregate used in the concrete.

Concrete Masonry Saves Labor for Shipyards

The use of concrete-masonry construction for the Edwin Markham Houses on Staten Island not only saved critical materials and war transportation but gave employment to masons rather than using the carpenter labor urgently needed in shipyards.

Completion of the development by the New York City Housing Authority as a Victory Housing Project in coöperation with the Federal Public Housing Authority provided modern living quarters for 360 families, chiefly shipyard workers.

War activities have created a serious housing shortage on Staten Island, New York's fifth and smallest borough, south of the tip of lower Manhattan. Houses were in such demand that the first six of the 30 row houses were opened to tenants early in March of this year before completion of the other buildings or the landscaping of the 13 acre site.

Both exterior and party walls of all buildings are of lightweight concrete-masonry units with precast concrete sills and lintels. Similar units had been successfully used in the Clason Point Gardens Housing Project in the Bronx Borough, built by the same Authority in 1942.

The fact that this material was manufactured in concrete-products plants only a short trucking distance from the project also influenced selection of the material which was supplied by Hud-Cin Building Products, Inc., Westfield, New Jersey.

The project was named in honor of the famous poet, Edwin Markham, author of "The Man With the Hoe."

ELIMINATE PAVEMENT SCALING BY USE OF AIR-ENTRAINING PORTLAND CEMENT

IN Northern states where climatic conditions are severe, some concrete pavements have evidenced surface scaling caused by severe frost action, by direct applications of flake calcium chloride or rock salt to remove ice, or by repeated applications of granular materials impregnated with these salts. Increasing public demand on highway departments to keep roads open to traffic and to provide safe traveling conditions during winter months has in recent years led to widespread use of such salts, a practice which has been primarily responsible for the development of this scaling problem.

The extent and severity of the scaling depend upon the amount of salts used and the frequency with which they are applied. Scaling has not developed on all concrete pavements but generally only in those locations where heavy or frequent applications of salts have been made, such as at switch points on street car tracks and at intersections, grades or curves where especially good traction is required. Concrete pavements of excellent quality naturally have greater resistance to such exposures than do pavements built of inferior concrete; but pavements which would give excellent service under all other exposures may be damaged by heavy salt applications, especially if they occur early in the life of the pavements. The age of the pavement at the time these applications are first made is a factor. Concrete pavements less than approximately four years old are much more vulnerable to damage from these causes than are pavements of greater age.

In the last few years a comprehensive program of research has been carried on to find solutions to this scaling problem. A number of agencies have participated in this program, including certain federal departments, several state highway departments, cities, and Portland cement manufacturers, as well as the technical and research departments of the Portland Cement Association.

One phase of these studies was to develop effective coatings which could be applied to protect existing pavements. Many different materials were tried and hundreds of concrete specimens were tested under laboratory procedure which, in a more severe and accelerated manner, simulated the exposure occurring in the field when these salts are applied to icy pavements.

The second phase of the studies was to develop a means of producing Portland - cement concrete which would have high resistance to severe frost action, and immunity to the applications of sodium chloride and calcium chloride as commonly employed on rural roads and urban streets.

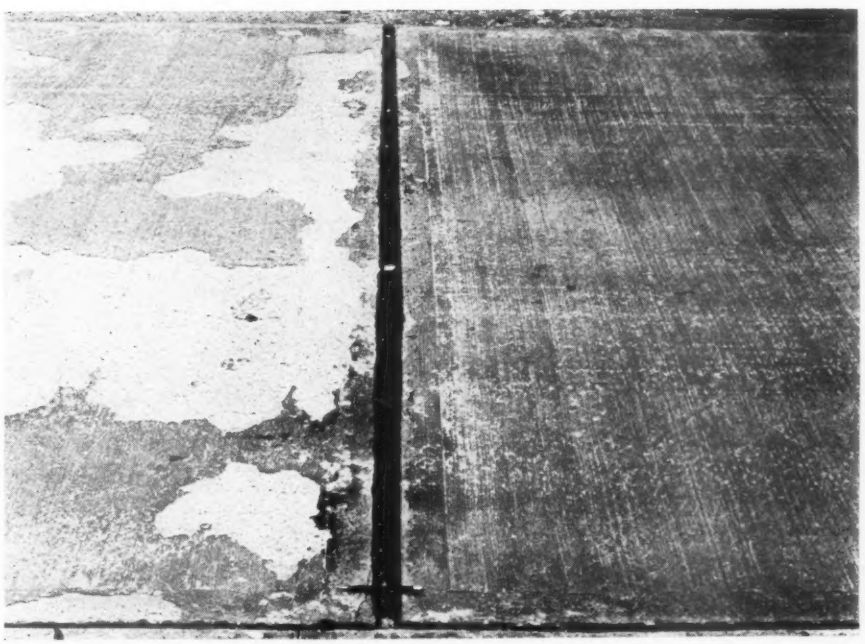
Results of the researches on this second phase by the several agencies have been must conclusive and unusually consistent in the case of both laboratory studies and widely distributed full-scale field experimental projects. It has been conclusively demonstrated that concrete having excellent durability as measured by its resistance to freezing and thawing and to the applications of common salt or calcium chloride can be produced with air-entraining cements, i.e., Portland cements with which minute quantities of certain air-entraining materials have been incorporated by intergrinding them with the clinker during the process of cement manufacture.

There are a number of resinous or fatty materials which, when interground with the cement clinker, have the ability to impart air-entraining properties to Portland cement. Some of those tried are beef tallow, fish oil stearate, and a commercial product known as Vinsol resin. Further studies may uncover other suitable air-entraining materials or other means of producing concrete having immunity to salt applications, but these potentialities of further research should not impede immediate application of the effective measures already clearly demonstrated and available.

Of the air-entraining materials studied, the one with which most experience has been had and from which results are most consistent is Vinsol resin. This is a product manufactured by the Hercules Powder Company. It is substantially the petroleum - hydrocarbon insoluble fraction of a coal-tar hydrocarbon extract of pine wood. Patents covering its use in cement manufacture have been dedicated to the public and thus all manufacturers of cement are free to use the process and the public is free to use cement so made without payment of royalties.

Thus far, Vinsol resin is the only air-entraining material which has been recognized in official specifications of the American Society for Testing Materials and of the Federal Government.

A Portland cement, ground with suitable air-entraining material in



Concrete pavement built with air-entraining Portland cement is highly resistant to freezing and thawing and to applications of salt or calcium chloride applied to remove ice. The pavement free from scale on the right side of the expansion joint was built with air-entraining cement and the pavement at the left in the same traffic lane and otherwise similar in construction was built with cement containing no air-entraining material.

Batch of concrete, made with air-entraining cement, dumped on subgrade. Note mix is cohesive, flattens out without segregation, and coarse-aggregate particles well coated with mortar.

proper amount, when combined with water and aggregates in the process of mixing, introduces into the resulting concrete minute and well-distributed air bubbles and imparts certain other characteristics not common to concrete made with the parent cement.

Extensive researches and field experiments have shown that concrete produced with air-entraining cement has excellent resistance to severe frost action and immunity to salt applications, whereas concrete made with the parent cement, containing no air-entraining material, under the same conditions may be seriously damaged.

The amount of entrained air reflects itself in reduced weight per cubic foot of the freshly mixed plastic concrete and also in reduced strength, as compared with concrete of the same proportions and consistency made with the parent cement containing no air-entraining material.

Best results with pavement mixes, taking into consideration both durability and strength, are obtained when this reduction in weight is not less than about 3 pounds per cubic foot and not more than 6 pounds per cubic foot. Research and field experience show that the above-stated lower limit will give the required resistance to salt applications, and that going beyond the upper limit results in no appreciable improvement in durability but is accompanied by some additional and unnecessary reduction in strength.

Air-entraining cements may be specified by the buyer by using the American Society for Testing Materials "Emergency Alternate Specifications for Portland Cement", ASTM Designation: EA-C150, which under Paragraph 3(b) provides for the addition of Vinsol resin to Portland cements of Types I and II during grinding, in amounts of not less than 0.025 per cent. and not more than 0.045 per cent. by weight of the cement. Similar provisions for the addition of Vinsol resin during grinding are included in the "Emergency Alternate Federal Specifications for Portland Cement", Designation: E-SS-C-191b corresponding to ASTM Type I and Designation: E-SS-C-206a, corresponding to ASTM Type II.

Concrete conforming to the desirable limits of weight reduction, previously stated, may be obtained with Portland cements containing Vinsol resin in amounts falling within the limits permissible under these specifications.

As brought out before, concrete made with air-entraining cements weighs somewhat less than normal concrete of the same consistency and proportions. It is highly resistant to severe frost action and to salt applications. The flexural strength of air-entraining Portland cement concrete may be from 10 to 15 per cent. lower than that of normal concrete of equal cement content. Even with this difference, the strength obtained with the usual paving mixes is ample for the structural requirements of pavement slabs; however if deemed necessary the loss in strength may be restored by an increase in cement content.

The workability of concrete made with air-entraining cements is excellent. The plastic concrete has a fatty appearance, is cohesive and somewhat sticky, but may be handled, screeded and finished with ease. Segregation and bleeding are greatly reduced, if not entirely eliminated.

The resistance of air-entraining Portland cement concrete pavement to heavy and frequent applications of salt is dramatically illustrated at this important street intersection. All this pavement has had the same exposure and the pavement was built similar in all respects except that the pavement free from scale to the left of joint was built with air-entraining cement.

In view of the extensive and conclusive evidence gained from researches and field experiments, the Portland Cement Association strongly recommends the use of air-entraining cements for the construction of concrete pavements in areas where severe frost action prevails or where the repeated application of sodium chloride, calcium chloride or granular materials impregnated with these salts is anticipated—such air-entraining cements being those with which a proper amount of approved air-entraining material has been interground as provided in the official specifications heretofore cited.

Because air-entraining cements and concretes made from them have certain special characteristics, some modification in normal construction practices should be made to obtain best results. No special problems are introduced which can not be overcome practically and economically with only slight changes in procedure. But if these problems are known and understood in advance, ready-mixed concrete producers, highway engineers and

contractors will be better prepared to deal with them. Therefore the following suggestions are offered by the Portland Cement Association:

1. Air-entraining Portland cements are more fluffy and in the dry state flow more freely than Portland cements generally used. The handling of sacked cement introduces no new problems, but because of the higher fluidity, some attention should be given to the handling and transportation of air-entraining Portland cement in bulk. All holes and cracks in storage bins should be plugged to avoid serious leakage.

2. Batching equipment must provide for a complete and positive shutoff of the flow of cement, when the proper amount has entered the weighing hopper.

3. In hauling dry-batched materials from a proportioning plant to the mixer an ideal condition would be to have individual containers for the cement. If air-entraining cement is placed loose in each batch compartment, the divider plates between batches and the truck end gate must fit tightly to prevent leakage. Loading the batches so that aggregates are placed at each end of the batch compartment, with the air-entraining cement loaded in the space between the aggregates, will prove helpful in avoiding leakage in the case of equipment which would be unsatisfactory without this precaution. Somewhat higher divider plates between batches may be required to prevent flow of cement from one batch to another when the truck body is elevated to a dumping position.

Concrete made with air-entraining cement is plastic and buttery during finishing operations. This characteristic is illustrated here by surface texture following second pass of the finishing machine.

4. As is usual in good construction operations, provision should be made to prevent loss of cement due to "blowing" in windy weather. This may be done by covering the truck with tarpaulins or by covering the cement in the batch compartments with aggregate.

5. It is recommended that at least the same cement content per unit volume be maintained for air-entraining Portland cement concrete as is used with normal paving mixtures. Somewhat lower strengths may be expected, but as discussed in a previous paragraph, strengths obtained are still ample for the structural requirements of pavement slabs.

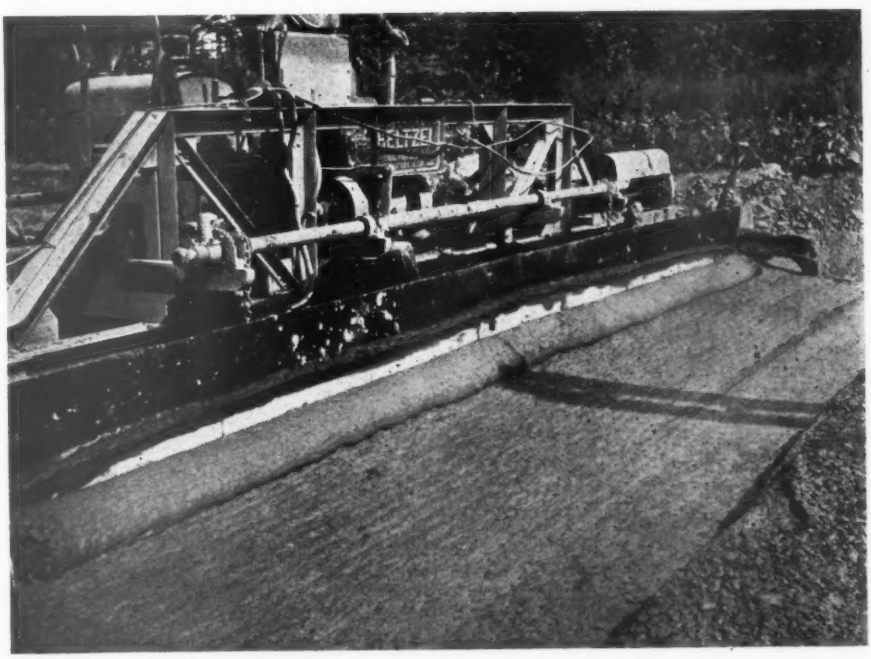
6. In designing air-entraining Portland cement concrete mixtures, consideration must be given to the increased volume of mortar resulting from the bulking effect of the entrained air. Advantage may also be taken of the inherent workability of the concrete resulting from the fatness and cohesiveness of the mortar. These factors permit some reduction in the quantities of sand and water commonly used in mixes designed for cements containing no air-entraining materials.

7. Taking as a criterion concrete mixes normally used for cements containing no air-entraining materials, a reduction in the batch weight of the sand by an amount equivalent to about 3 per cent. of the total weight of both sand and coarse aggregate should, under average conditions, very closely compensate for the entrained air. This reduced amount of sand and about ¼ gallon less net mixing water than normally used per sack of cement are suggested for incorporation in the first trial batches. Observations of the mix should then be made to determine whether further adjustments in the sand content, or in the amount of sand and coarse aggregate, or in the water content, are necessary to obtain proper workability and consistency. Yield tests should be made and used as a basis for further correction in the mix to obtain the specified cement factor.

8. The mixing time for normal Portland cement concrete (1 minute), usually specified when standard revolving-drum batch paving mixers are used, is also adequate for thorough mixing of concrete made with air-entraining cements. Inadequate mixing will not permit entrainment of sufficient air in the concrete; and conversely, prolonged mixing is unnecessary and may in some instances tend to increase the entrained air beyond the limits which are desirable for adequate flexural strength.

9. Concrete made with air-entraining cement can be readily handled and spread because the mix is very workable, cohesive and does not readily segregate. In most cases advantage may be taken of this improved workability by reducing the water content without impairing the placeability of the mix. The mixture must be kept in the plastic range to insure entrainment of air in the concrete and the consistency should be adjusted to give satisfactory place-

(*Continued on page* 96)



Finishing machine making second pass over concrete made with air-entraining cement. The plasticity and cohesiveness of the mix are exhibited by the roll of concrete ahead of the screed, by the fatty appearance of the surface after the first screeding and by the bank of plastic concrete left by the screed as it backed away to make the second pass.

Batching plant of the Acme Ready Mix Concrete Company at Rockford, Illinois.

WOMAN MANAGER OF READY-MIX FIRM DEVELOPS BIG MARKET AMONG FARMERS

another ON THE SPOT report

LAST year the Acme Ready Mix Concrete Company was formed in Rockford, Illinois, a new plant was erected, and the production of concrete got under way with a flourish. War industries were expanding, hundreds of new houses were being built to relieve a shortage of dwellings, and business was rather good for the new concern.

Then came rumors—later substantiated—of government orders curtailing building, and the completion of the war-plant construction program. The operators of the concrete company were called into the armed services and left the management of the business in the hands of a young woman, Miss Hazel Darnill, who had been looking after the office and accounts of the company.

Miss Darnill has proved fully capable of the task assigned her. She has developed an amazing business in the rich farming area surrounding Rockford, 90 per cent. of the concrete currently being produced by the concern being delivered into these rural communities.

A mail-advertising campaign directed to farmers pointed out the advantages of ready-mixed concrete over the job-mixed variety and stressed, too, the many hours of labor her company might save the farmers—labor sorely needed in plowing and cultivating the land and harvesting the crops—by using prepared concrete for paving feeding floors, barn floors, driveways, etc. The direct-by-mail campaign was supplemented by radio advertising consisting of "spot" announcements over Rockford's station WROK several times daily.

General Manager Hazel Darnill and Plant Superintendent Earl Hall.

Farmers soon began making inquiries and placing orders. Neighbors, seeing the Acme trucks making deliveries, followed suit. Hauls are made up to 18 miles from the plant, the standard grade of "farm concrete" with a maximum coarse-aggregate size of ¾ inch selling for $7.75 per cubic yard within a 4-mile radius. A nominal charge of 10 cents for each additional mile makes

(*Continued on page* 97)

Sells Bulk of Output to Farms; Truckers Carry Return Loads

The Van Ess plant. A corner of the covered storage yard may be seen at the extreme left in the picture.

THE full potentialities of the farm market for concrete products have only recently been realized by many producers located in or near farming areas. Formerly comparatively little attention was paid to this market except by makers of silo staves and similar products but in the last year or two, especially since the decline in warplant construction began, the situation has changed. Many producers now find this to be a profitable and growing field.

One of the pioneers in developing this market was William Van Ess of Green Bay, Wisconsin, who operates a modern concrete block plant on the outskirts of that city. Farmers now buy nearly 85 per cent. of the output of this plant and deliveries are made within an 80-mile radius in the company's trucks. Blocks are also carried as return loads to points up to 130 miles away by farmers or haulers from Wisconsin and Michigan who have delivered cattle to a packing plant in Green Bay. Much of this demand is for standard 8- by 8- by 16-inch blocks which are used for farm machine sheds and similar structures. For barns, milk houses, garages, pig pens, houses, etc., 8- by 12- by 16-inch blocks are preferred.

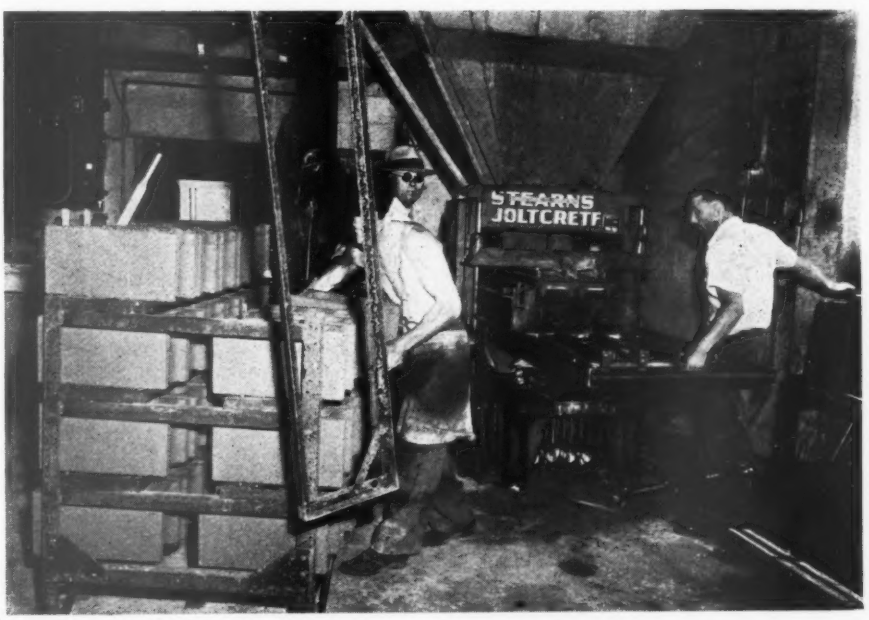
Mr. Van Ess began making blocks for his own use in 1908 when he went into the concrete and sidewalk contracting business and soon began making them for sale on a small scale. Hand molds were used until 1923 when he bought his first machine. Since then the business has grown steadily and early in 1942 a Stearns Number 7 Joltcrete block machine was installed to keep up with the demand. Recently Mr. Van Ess retired, leaving the management of his businesses to his three sons as a coöperative enterprise. Fred now operates the block plant, Alphonse carries on the contracting business and Frank operates a filling station on the premises.

Sand and gravel aggregates are used except for occasional demands for lightweight units in which Waylite is used. These aggregates are delivered in trucks and are elevated to bins over the Stearns 18-cubic foot mixer. Volume batching boxes are used. The cement is received in sacks which are carried on an inclined conveyor to the mixer floor. The concrete is discharged by gravity into the hopper of the Joltcrete machine. This arrangement is only temporary and will be changed when equipment becomes available. Mr. Van Ess intends to install a 40- or 50-cubic yard aggregate bin with a weighing batcher and will put the mixer on the ground floor with a skip feeding the block machine. With this system he will be able to feed the concrete to a second machine which will be installed.

The Joltcrete machine makes up

Moving a rack-load of blocks with a hand-operated lift truck.

to 2200 standard blocks in the 6½ hours during which it is operated in an 8-hour day with a total plant crew of five men. Only 4-, 8-, and 12-inch blocks are made with their corner, header and sash blocks. Manhole and silo blocks and some

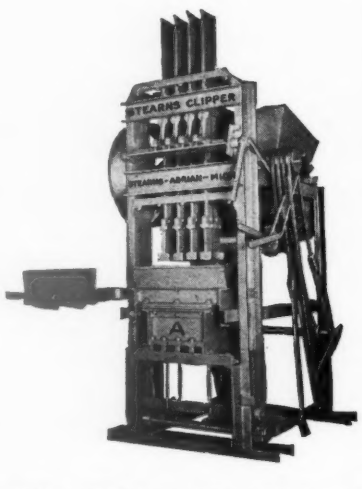


The block machine with off-bearer and operator at work.

10-inch blocks are made in a hand-operated machine.

Steel-and-wood racks are used and these are handled by means of two Yale & Towne lift trucks. Curing is done in three rooms with a capacity of 750 blocks each. No steam is used but in cold weather the aggregates and mixing water are heated. This works out very well in combination with a furnace which is used for heating the entire building. According to Mr. Van Ess, a 100-pound steam boiler which was used when tamped blocks were made is no longer needed. A mix yielding 22 blocks per sack of cement results in strengths of from 2,600 to 3,000 pounds per square inch at 28 days.

The outdoor storage yard has a capacity of over 100,000 blocks and has concrete runways. A covered storage building is used when trucks are loaded under extreme weather conditions.



The Clipper Stripper, shown above, available in 5 models, is only one of the popular machines in the ANCHOR Line of Complete Equipment for the Concrete Products Plant. ANCHOR Engineering Service in the design of new plants or revamping older operations is nationally famous. Consult us before you buy equipment or modernize your plant . . . it costs no more.

Hobbs block machines, Anchor tampers, Anchor, Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers and pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.

G. M. Friel, Manager — Columbus, Ohio

Gets Contract to Make Two Million Blocks

Julius Sorenson & Sons of Racine, Wisconsin, have obtained a contract to manufacture 2,000,000 concrete blocks and are now erecting a plant in South Greenville, Mississippi, for that purpose. The plant is expected to be in operation early in October. The blocks will be used in revetments on the Mississippi River in the Vicksburg Engineer District.

Cleveland Workers Win Wage Increase

The National War Labor Board Trucking Commission on August 21 unanimously approved increases of ½c, 2c and 3½c an hour for three classifications of 261 employees in an agreement between the Building Material Dealers of Greater Cleveland, Cleveland, and International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers, AFL, Local 436. The increases are within the "Little Steel" formula, which permits increases totaling 15 per cent over the straight-time hourly rates of January, 1941.

The approved increases are as follows:

	Old Rate	Approved Rate
Yardmen	$ .80	$0.805
Drivers	.90	.92
Ready-mix operators	1.00	1.035

The companies involved are the Bennett Concrete Stone Company, Cleveland Builders Supply Company, Clifton Coal & Supply Company, Collingwood Shale Brick & Supply Company, Geist Coal & Supply Company, Goff-Kirby Company, Ohio Building Material Company, Chas. Svec Inc., and Zone Coal & Supply Company.

Vinsol *(from page 93)*

ment under job conditions and with the equipment being used.

10. Concrete so made is almost free from sedimentation or bleeding. As a result there is little free water on the surface for lubrication during finishing operations. This makes it necessary to carry out finishing operations without delay, or else drying will harden the surface and hinder satisfactory workmanship. The absence of free water on the surface is more critical at high temperatures, when the relative humidity is low or when the wind is blowing at high velocity. This condition may at first appear objectionable but after operations have been adjusted to the material, this characteristic offers distinct advantages. Finishers are able to follow closely behind the mixer, long waits and overtime at end of the day are avoided and early protection and curing are permitted.

11. Under some conditions air-entraining Portland cement concrete, being more sticky than normal concrete, may adhere to the screeds of the finishing machine and cause a "torn" surface. When this occurs, it may be overcome readily by increasing the transverse oscillations of the screed in relation to its forward motion. Six to eight complete oscillations per foot of forward travel have been found to produce good results.

12. For hand-finishing, steel floats or steel-shod floats have in some cases given better results than wooden floats. All hand-finishing operations should follow closely behind the finishing machine.

In Cleveland **HOTEL HOLLENDEN** — *In Columbus* **NEIL HOUSE**

In Lancaster, O. **THE LANCASTER** — *In Corning, N. Y.* **THE BARON STEUBEN**

Check IN

THEO. DeWITT — PRESIDENT

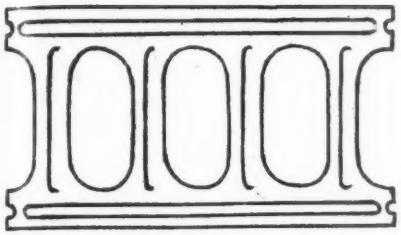
DeWITT OPERATED HOTELS

YOUR STORAGE PROBLEM!

Your operation may be vital enough to justify a preferred rating. If so, we can rush your bins up in a hurry.

Super-stave type . . . any capacity. 1943 catalog on request.

NEFF AND FRY COMPANY
Camden, Ohio



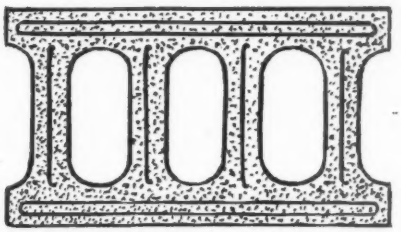
Use COMMERCIAL Cored Steel Pallets

The pallet for economy in machine equipment and maintenance cost. Practically indestructible. Will not crack, break or warp. Easy to handle, easy to store.

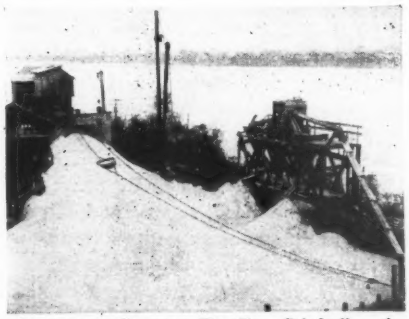
Write for catalog.

THE COMMERCIAL SHEARING AND STAMPING CO.
Youngstown, Ohio

for perfectly formed CONCRETE BLOCKS



MORE YARDAGE WITH LESS LABOR



Sauerman Scraper Handles Stockpile of Crushed Silica at Drying Plant

WHEREVER there is a problem of excavating from pit or bank, stockpiling, or other work involving haulage for any distance from 100 to 1500 ft.—it pays to find out what a Sauerman Slackline or Drag Scraper will do and what it will cost. Time and again a Sauerman machine shows a saving in comparison with any other equipment that will dig and haul an equal yardage under given conditions.

WRITE FOR CATALOG

SAUERMAN BROS., INC.
534 S. CLINTON ST., CHICAGO 7, ILLINOIS

SAUERMAN
LONG RANGE MACHINES

Acme *(from page 94)*

it possible for a farmer 10 miles from town to get quality concrete dumped into his forms for only $8.35 per cubic yard—about a dime per square foot for a 4-inch slab. Twenty minutes of waiting time is allowed, after which the penalty is $3.00 per hour.

The plant which is batching the concrete is well designed, lacking only some of the automatic equipment that is desirable for speedy operation but hard to get nowadays. Aggregates are purchased and are received by dump truck. After being discharged into a hopper they

Portable hopper in service on a war-plant job. The set-up was made for low-discharge trucks which accounts for the earthen ramp. With Acme's high-discharge units, it was necessary to use an extended chute.

are elevated to a Johnson 3-compartment bin of 160 cubic yards capacity, a swinging spout diverting the different sizes to the proper compartments. Cement is shipped in sacks in box-cars and is emptied into the boot of an elevator which carries it to a measuring tank located alongside the aggregate bin. A Kron dial scale is employed to weigh out the aggregates, the cement and water being measured by volume.

Five truck-mixers, 3 Jaegers and 2 Smiths, are mounted on International chassis. They are of 3 and 4-cubic yard capacity and all are of the high-discharge type. A Butler portable hopper is used on some of the larger jobs to avoid delaying the truck-mixers at the job site.

The truck-mixers are kept spic and span—Miss Darnill insists upon this as a matter of good business and good advertising. Each night they are carefully washed and then sprayed all over with a light paraffin oil. The oil not only makes washing with plain water easy but prevents rusting and gives the units a shiny and attractive appearance as they make their appointed rounds.

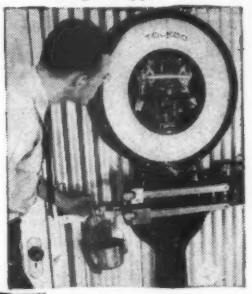
[SC]² PRECISION CONCRETE CONTROL

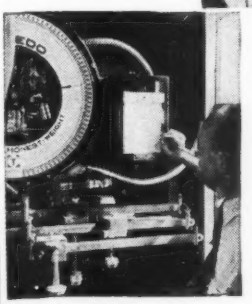
IMPROVES QUALITY
REDUCES COST

Attaches to your Weigh Hopper

Moisture Meter

The only unit capable of determining moisture content in ONE minute.





Compensator

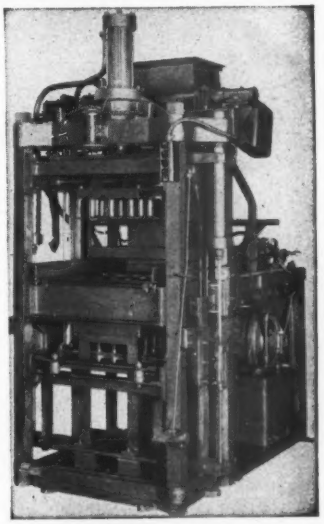
Delivers correct DRY weight of aggregates and ADDED water.

Makes a graph record of EVERY BATCH.

[SC]² CONTROL produces remarkable uniformity. Is always approved by concrete engineers. Has definite sales value. Write for our booklet "PROFITS IN CONCRETE."

SCIENTIFIC CONCRETE SERVICE CORP.
McLachlen Bldg., Washington, D. C.

Why not BUY the LATEST FASTEST and BEST PRODUCTION BLOCK MACHINE



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Write for information.

KENT MACHINE CO.
Cuyahoga Falls, Ohio

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100% COVERAGE

Read and used by every major buying factor in all plants

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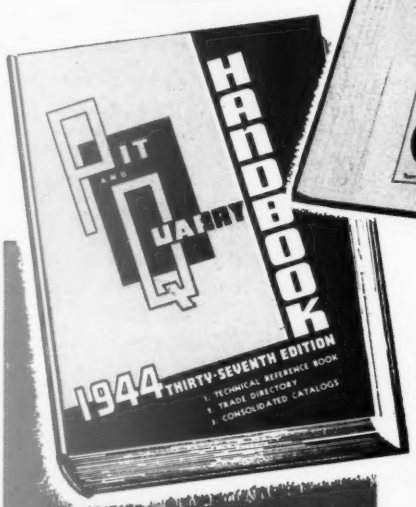

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EDITORIAL-ADVERTISING TIE-IN MAKES IT EASY FOR BUYERS TO GET COMPLETE INFORMATION ABOUT YOUR PRODUCTS

IT'S A REFERENCE MANUAL
IT'S A BUYING GUIDE
IT'S A DIRECTORY OF THE INDUSTRY

Delivers Your Product Story All Year At One Low Cost

Day after day, week in and week out, for 12 full months, the Pit and Quarry Handbook is a constant source of tested production ideas and practical operating and maintenance methods.

BUT IT IS MORE THAN JUST THAT — the men who read the Handbook consult it for a purpose. Consequently, your catalog advertisement, facing an authoritative technical article dealing with the problem your product is designed to solve, strikes the reader at the exact moment that he is most inclined to buy.

THIS ADVERTISING-EDITORIAL TIE-IN means that your advertisement in the 1944 Pit and Quarry Handbook is on display in the Show Window of the Industry every single day for a solid year.

TODAY'S MANPOWER SHORTAGE compels operators to seek short-cuts and employ labor-saving materials and equipment wherever possible. And, as always, they will depend upon the Handbook for solutions to vastly greater problems in 1944. Therefore, you may be sure of a receptive audience of foresighted buyers when your sales message appears in the 1944 Pit and Quarry Handbook.

MANUFACTURERS ARE URGED to tell their complete product story in this successful sales producer. The 1944 Handbook is now in preparation. Make sure that all your suitable products are shown and that your catalog copy appears in every section dealing with processes in which these products are used.

IF . . .

you design, distribute, make or sell . . . an article, product, service or machine . . . for use in the production, operation, maintenance or processing fields . . . of the Cement, Gypsum, Crushed Stone, Lime, Sand or Gravel Industries . . .

THEN . . .

the 1944 Pit and Quarry Handbook is your medium.

★

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Handbook catalog advertising follows a definite pattern. We will gladly help you prepare your copy; or, if you prefer to have your advertising department or agency do it, we will send you sample advertisements to follow for style.

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SPECIAL DISCOUNTS

To help reduce make-up costs we offer the following discounts for prompt action. A 1% discount if your copy and cuts are received by October 15th and an additional 2% for advance payment by that date.

WRITE FOR FOLDER, completely describing the 1944 HANDBOOK and how it helps sell your products to nearly 5,000 executives, managers and superintendents in America's nonmetallic mineral industries.

PIT AND QUARRY HANDBOOK
538 S. Clark Street Chicago 5, Ill.

Pouring 15 Acres of Floor Slab, AT WAR SPEED, Called for Mobile Jaeger Truck Mixers...

that's why THE CALL WILL BE FOR JAEGER TRUCK-MIXED CONCRETE FOR POST-WAR BUILDING!

This war, which has taught armies the value of mobility in firepower, has shown the construction industry the advantages of the mobile truck mixer.

On innumerable war projects like the above, Jaeger Truck Mixers have demonstrated more efficient mixing and placement of concrete to the architects, engineers and contractors who will dominate future construction in America.

As an established "ready-mix" operator, your post-war advantage is assured provided you continue to maintain satisfactory service, for the duration, with your present mixer fleet.

To get the longer service that is built into your Jaeger Truck Mixers: (1) Make each driver responsible for his unit. Send for Jaeger Manuals and insist on operation, cleaning and lubrication as specified therein; (2) Arrange with your Jaeger distributor for a regular 30-day check-up on every machine.

THE JAEGER MACHINE CO.
602 DUBLIN AVE., COLUMBUS, OHIO

TOP: Processing plants along the river edge. Tower is terminal of first conveyor crossing the river from the quarry. **CENTER:** Second crossing of river. Conveyor goes in tunnel under aggregate stockpile. Aggregate is stockpiled by 7 B-G Stackers. **BOTTOM:** General view of dam site looking upstream.

All Photos Courtesy T. V. A.

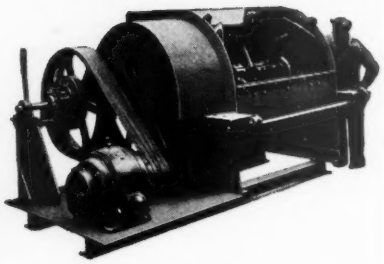
T.V.A. Engineers were faced with a particularly difficult aggregate handling job in constructing Fontana Dam. They solved that problem by an ingenious conveying system using 37 belt conveyors. Equipped with Barber-Greene troughing idlers and terminal machinery totalling approximately two miles of conveying equipment, the system crosses the river twice and processes the aggregate as it travels from the quarry to the dam. Shown on these two pages are some of the conveyors used in the setup as the T.V.A. Engineers worked it out.

TOP: View of aggregate processing plants. **BOTTOM:** Dam under construction showing B-G Conveyors bringing raw aggregate to batch plant and conveying mix to the forms.

BARBER-GREENE

AURORA, ILLINOIS, U. S. A.

Thorough Low-Cost Mixing with MULTI-MIXER



MULTI-MIXERS are supplied in either motor drive or geared-head drive eliminating pulleys and clutches. Reverse screw-type mixing action insures better concrete. All are SKF ballbearing equipped, with double seal ring packing bearings, etc., to eliminate the entrance of dirt. Abrasive-resisting steel or chromium plated liners available. Capacities from 5 to 60 cubic feet. Ask us for the names of well-satisfied MULTI-MIXER users. *Write Today for Complete Information!*

MULTIPLEX Equipment Available

We are in position to give reasonably prompt service on all orders. However, we regret that we are unable to supply new equipment unless a priority rating high enough to permit us to re-supply ourselves with the necessary steel accompanies your order. If you will supply us with your priority rating when ordering, it will aid us materially in determining our ability to serve you.

Multiplex Concrete Machinery Company
ELMORE OHIO

War Construction Still Needs Concrete Men

Expediting the war effort is still the first duty of concrete contractors and concrete products manufacturers.

Needs for war housing and war plant improvements are not yet satisfied. Facilities for preserving and storing war foods are as urgently needed as ever. Farmers still need concrete improvements such as feeding floors, paved barnyards, and sanitary milk houses, which save labor and increase farm production.

Concrete construction for any of these vital purposes requires minimum use of scarce materials. Transportation is saved because the bulk of concrete materials is usually available within short hauling distance of any project.

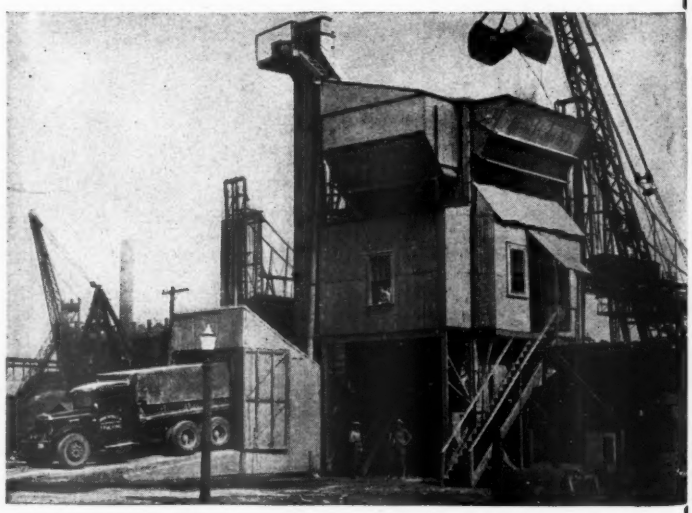
PORTLAND CEMENT ASSOCIATION
Dept. A10-58, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete . . through scientific research and engineering field work

BUY MORE WAR BONDS

There'll Be a Better World—Tomorrow

AND BUTLER BINS WILL HELP TO BUILD IT

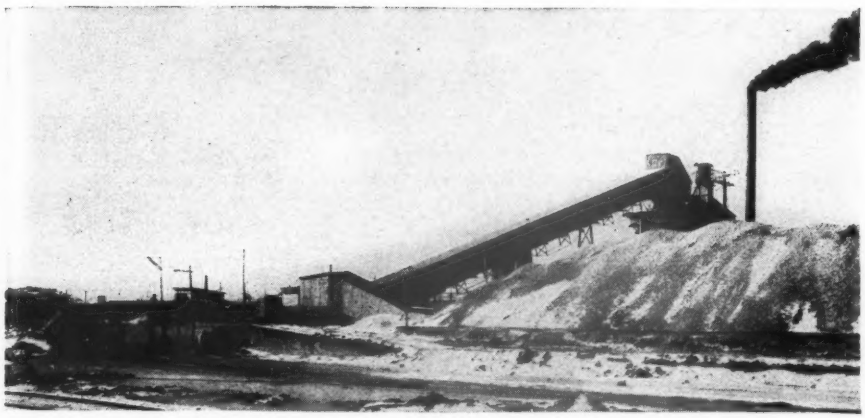


Right now the prosecution of the war is the primary consideration of every American, and everything else must wait upon final victory. But when that victory is won, there will be much to rebuild in devastated areas, many construction programs deferred by the war to be resumed. Then, as now, Butler ready mixed concrete plants, sand and gravel plants, and concrete products plants will be found on nearly every project where time and efficiency are important.

There will be important developments, after the war, designed to make construction jobs easier and less costly; you may be sure that Butler will pioneer them. But meanwhile, if you have a war project, don't fail to contact your Butler engineer for advice and equipment.

BUTLER BIN COMPANY • WAUKESHA WISCONSIN

NEARLY NEW CONCRETE BATCHING PLANT



Capacity 250-350 Cu. Yd. Per Hour . . . Available for Immediate Delivery.

Complete Butler concrete plant. Excellent condition, used only 7 months. Adaptable for either commercial or construction use where high rate of concrete pour may be required. Equipped for manual, semi-automatic or automatic operational control. See details below.

BATCHING BIN. Bin—250 yd. capacity—190 yd. 3-compartment aggregate 400 bbl. cement.

2 BUTLER CEMENT STORAGE BINS. 2,000 bbl. capacity, 2-compartment, 3,000 bbl. capacity, single compartment. All bins equipped with air jets and steam jets.

BATCHERS. 1 Butler aggregate 5 yd. capacity, complete with beam-type scale, manual operation.

1 Butler cement 3,000 lb. capacity, complete with beam-type scale, manual or automatic operation.

1 Butler water batcher 200 gals. capacity, beam-type scale, complete with 400 gal. surge tank and valves, manual or automatic operation.

ELEVATOR & TRACK SCREW. 300 bbl. per hour capacity, screw 37 ft. long, equipped for either box car or hopper car cement delivery. Complete with 20 hp. electric motor.

CONVEYORS, 1 Barber Greene 36" inclined conveyor 237 ft. long, equipped with: 50 hp. Century motor; one 40 yd. track hopper; one 20 yd. track hopper; one 20 yd. truck hopper. All necessary A frames, trusses and supports included. All hoppers equipped with discharge gates.

1 Barber Greene 36" horizontal conveyor 180 ft. long. Complete with 18 double clam-type fill valves, 20 hp. Century electric motor complete with trusses.

1 Barber Greene 36" inclined conveyor 60 ft. long. Complete with 15 hp. electric motor, trusses and supports.

All conveyors in excellent condition; two-way Alemite system of lubrication; band-type brake; pivoted distributor, ground level controlled. Conveyors operated under cover while in use. Idler take-up and return idler rollers in good shape. Extra length new 500 ft. belt available.

MISCELLANEOUS. Collecting hopper under batcher, 5 feet cement screw feeder complete with motor for automatic control of cement. Traveling hopper for charging batch trucks. Extra cement buckets, drive chain, elevator chain for cement elevator and track screw, etc.

Also 28 Late Model Transit Mixers

12—1942 Model Jaegers—High discharge, separate engine drive with two-speed transmission. 8 mounted on 1942 Dodge six wheelers, good rubber, excellent condition.

10—1942 Model Smiths—High discharge type. These mixers were used only 6 months.

Also 6—1938 Model Smiths—High discharge type. 3 mounted on 1938 Autocars, 2 on Macks and 1 on White truck. All single axle drive in good condition, with good rubber.

MOTOR TRUCK SALES AND EQUIPMENT COMPANY

Telephone: CALUMET 1255

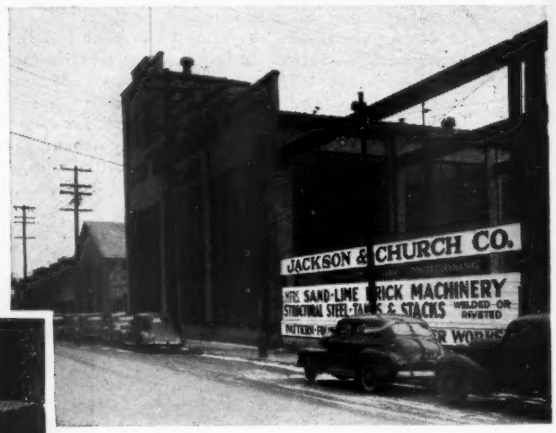
2435 COTTAGE GROVE AVENUE **CHICAGO, ILLINOIS**

28,000 BRICKS IN ONE EIGHT HOUR SHIFT WITH THE J&C BRICK MACHINE

Smart operators find Jackson & Church units to be highly profitable installations. They eliminate the need for costly pallets. Gravel pit fines are ideal for brick making in a J & C press.

Below: Because of their even texture, sharp, square corners and perfect uniformity, Jackson-made bricks are winning the praise of contractors and architects from Maine to California.

Either frog-type or solid concrete bricks can be produced at the rate of up to 14,000 in an eight hour day (on model C machine shown here) or up to 28,000 per day on the larger type A machine.



Above: The Jackson and Church plant shown above was constructed of J & C made bricks. Producers find that J & C made bricks are easier to sell because of their uniformity, quality and appearance. J & C units produce plain or colored bricks from Haydite, Waylite, Superock, Pottsco, cinders and other light weight aggregates. From a single sack of cement, with a J & C machine, up to 320 concrete bricks can be made, with strengths as high as 3700 pounds per square inch and absorption as low as 6%. For complete information write to Jackson and Church Co., Saginaw, Mich.

JACKSON AND CHURCH COMPLETE BRICK-MAKING PLANTS

KRON DIAL SCALES

FOR *Accurate* PROPORTIONING

Helped smash all records for construction of landing mats at new Ottumwa Naval Air Station

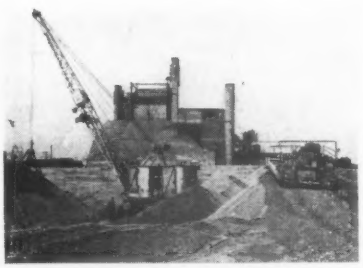
The Simplicity System Company, Chattanooga, Tenn.

★ HERE'S another example of how **KRON DIAL SCALES** played an important part in the Nation's war effort by assuring absolute dependability — accurate proportioning of bituminized aggregates for the huge landing mats at the Ottumwa Naval Air Station. Each mat is covered with a 2" asphalt surface, each requiring 35,000 tons of bituminized aggregates. **KRON DIAL SCALES** were used exclusively and construction was completed in record time under most severe weather conditions.

For precision performance—to measure the job accurately—**KRON SPRINGLESS DIAL SCALES** are universally preferred by contractors everywhere.

★

View shows a small section of the tremendous amount of aggregates required for constructing landing mats at this Iowa Naval Air Station.



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THE KRON CO.

1728 FAIRFIELD AVE. BRIDGEPORT 5, CONN.

weighs less... digs more!

★ ★ ★ ★

Lightweight ★ ★ ★ ★

Here's how you can step up your yardage . . . move *more material* and move it *faster* . . . with your present machines, regardless of their normal capacity.

You can get increased yardage by using a larger bucket than that for which your machine was designed without exceeding the allowable loaded weight. This also applies to long boom operations. *But* you must have HENDRIX Lightweight Buckets! They're lighter . . . we've taken the load out of the bucket itself, to enable you to put bigger loads inside. In wet digging, you get an extra bonus pay load every trip by leaving the water in the pit. HENDRIX Lightweights give you strength, toughness, durability, plus many inbuilt features designed to increase your "digability."

★ **20% to 40% lighter than other buckets, type for type.**

★ **All Welded construction . . . for greater strength and durability.**

★ **Manganese steel chains, fittings and reversible tooth points.**

★ **Gets full load pay material every trip . . . even in wet digging.**

★ **3 types—light, medium and heavy duty—⅜ to 20 cu. yds.**

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DeSoto Foundry, Inc.—Mansfield, Louisiana

HENDRIX *Lightweight* **DRAGLINE BUCKETS**

FORTIFY POINTS OF EXTRA WEAR WITH

BERGSTROM *Free Flowing*

HARD SURFACING ELECTRODES

IF you operate any equipment on which some surfaces are subject to extra wear, these electrodes can help prevent troublesome breakdown—and save money. They deposit a layer of metal that has extra resistance to abrasion and corrosion. Bergstrom Electrodes flow freely—do not form scale. Easily applied in any position.

WRITE FOR FREE INFORMATION.
We will send you an outline of the specific job each of the six types of Bergstrom Electrodes is designed to do.

UNITED STATES STEEL SUPPLY COMPANY
USS STEELS SERVICE

UNITED STATES STEEL SUPPLY COMPANY

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PITTSBURGH (12) · CLEVELAND (14)
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ARMSTRONG-BRAY
STEELGRIP
FLEXIBLE BELT LACING

Prompt Delivery. Best all around conveyor and power belt lacing because it can be applied with a hammer. Comes in handy packages or long lengths for conveyor belts. It compresses belt ends, prevents fraying. Comes with 2-piece hinged rocker pins. Write for Catalog showing the most complete line of belt lacing made.

Also Mfg. Wiregrip Hooks and Lacers.

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"The Belt Lacing People"
5386 Northwest Highway
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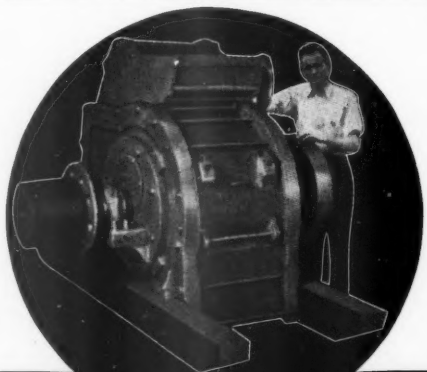

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Its wide crushing range makes it serve the purpose of two or more other types of crushers. Roller bearing equipped. Write for Bulletin.

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KNOXVILLE, TENNESSEE

B&W CASTINGS

ELVERITE, for wear resistance
ADAMANTINE, for abrasion-resistance, great strength and machinability
HEAT-RESISTANT CASTINGS

C-45

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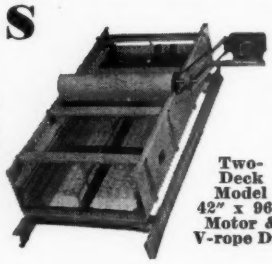
Complete line of—

Tried, Proved and Guaranteed Vibrating Screens. Since 1919, the BEST in screening equipment at the LOWEST COST.

NEW! 32-page Catalog on Screens and Screening. Just ask for Catalog No. 107.

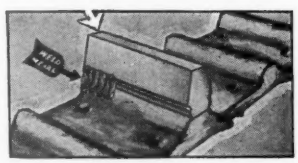


Two-Deck Model 42" x 96", Motor & V-rope Dr.

UNIVERSAL VIBRATING SCREEN CO.
RACINE — WISCONSIN

Rebuild your
TRACTOR GROUSERS
WITH **BULLDOG**
Grip-Lugs

EASILY



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INCREASES TRACTION EFFICIENCY

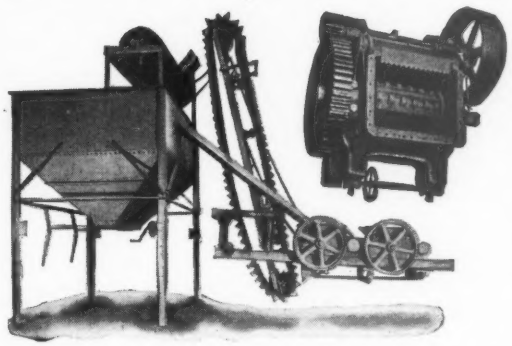
A QUICK AND ECONOMICAL REPAIR

ALLIED STEEL PRODUCTS, INC.
N. B. C. BUILDING CLEVELAND 14, OHIO

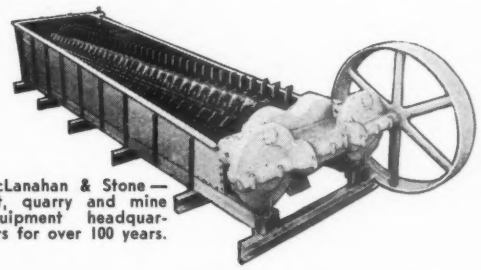
McLANAHAN

SCREENS · CRUSHERS

COMPLETE PLANTS



McLanahan equipment will prepare your plant for more business. Single and double roll and jaw crushers, hammermills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs and hoists—complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any material.



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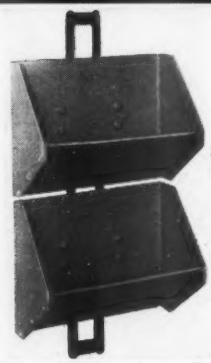

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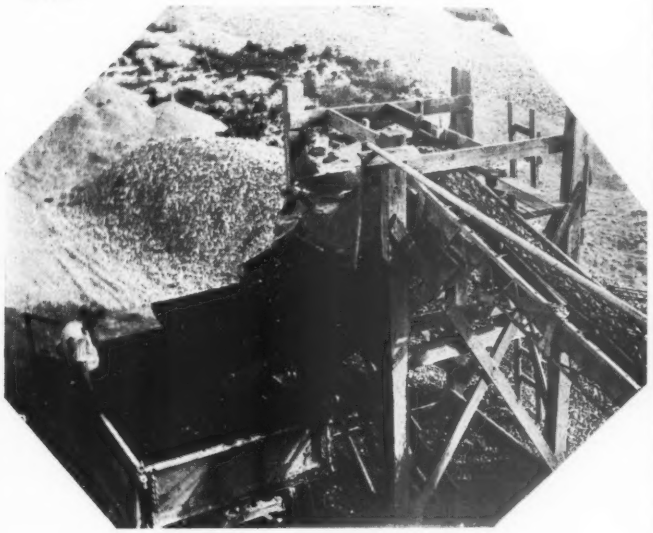

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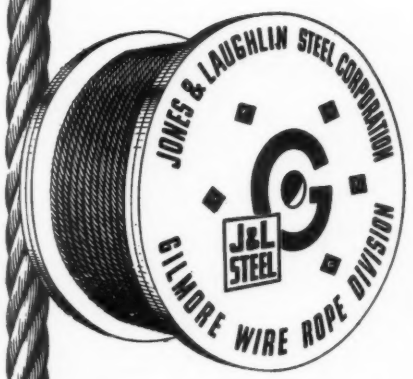
keeps fighting tools moving to the fighting fronts



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Robins double roll coal crusher, 24"x30".
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Single roll crusher with knobs, 24"x24".
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Simplex Unit coal pulverizer, type 33A.
American Standard double roll crusher, 36"x30".
Sturtevant No. O Rotary Fine Crusher.
Williams No. 2 Semi-Vulcanite hammer mill.
Williams No. 2 Regular hammer mill.
Traylor "Bulldog" 11" gyratory crusher.
Jaw Crushers—8"x14", 9"x16", 11"x20", 18"x32".

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Revolving screens—3'x8', 4'x16', 42"x18', 5'x20'.
Hummer vibrating screens and 15 cycle generators.
Two 3 deck 2'x5' Jigger vibrating screens.
100 new Hummer "TONCAP" screens, 3'x5', 4'x5'.
Diamond vibrating screen, 3 deck, 4'x8'.

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50' vertical bucket elevator, 16" buckets on chain.
40' vertical elevator, 18" malleable bucket.
50' vertical chain elevator, 20" malleable buckets.
40' chain elevator, 10" malleable buckets.
55' belt continues inclined elevator, 14" buckets.
35' continues elevator, 30" buckets, 2 strands chain.
1500' 6 ply 20" punched elevator belt.
Gears, sprockets, elevating & driving chain.
New K2 and couplings for C102½ and C188 chain.

BELT CONVEYORS

100' 30" trough belt conveyor.
16" trough belt conveyor, 100' long.
Three 14" trough belt conveyor, each 100'.
40 Robins 42" trough idlers.
Belt idlers and pulleys, 14" to 36".
86' new 54" conveyor belt, 5-7 ply. 3/16" top.
600 36" 4 ply rubber coated conveyor belt.
700 30" 6 ply conveyor belt, ⅛" top surface.
200 42" 7 ply conveyor belt, ⅛" surface.
Flat Steel belt conveyor, 48"x100'.
Jeffrey foundry mold conveyor, 42"x150'.
Four Robins 14" Automatic belt trippers.
100 Jeffrey 38"x5" idlers with Timken roll bearings.

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Dings Magnetic pulley, 12" dia. 14" face.
Two electric car pullers with AC motors.
Sprague Electric car puller, DC motor.
Motors, Generators and centrifugal pumps.
Worm drive speed reducers—75 to 1.50—1, 40—1.
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1½ ton Mercury 30" gauge battery locomotive.
Flat cars 20" and 24" gauge.
Two yard 36" gauge V shape end dump car.
6" electric centrifugal sump pump.

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14"x12" Chicago NSB, 100 hp slip ring motor, 529'.
4 cyl. Schramm V belt to 60 hp AC motor, 360'.
2 cyl. Ing. Rand with 50 hp Waukesha motor, 270'.
6"x8" Ing. Rand Vertical hopper cooled, 44'.

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1—15-ton Bucyrus Erie locomotive crane, Serial No. 233, with 40' boom, steam powered. Equipped with air brakes. Thoroughly REBUILT. Cap. at a 12" radius and a 2 part line, 30,000 lbs. Boiler vertical size 54"x 7'6". Shipping wt. 87,500 lbs.

AIR COMPRESSORS

1—1190 cu. ft. Ing. Rand 2 stage comp. Requires 206 H.P. to operate at 100 lb. pressure.
1—835 cu. ft. actual Ingersoll Rand low pressure Diesel driven compressor, Class ER-GAS, size 16x7x19, rated 835 cu. ft. at 40 lbs. pressure.
1—347 cu. ft. Sullivan, class 13, 2-stage comp. power 112 H.P. Diesel engine.
1—200 cu. ft. Chgo. Pneu. comp., power Diesel engine.
1—Air receiver, 60" dia. x 120' long.
Portable:
1—315 cu. ft. LeRoi, 2 stg. mtd. on 4 pneu. tires.
1—210 cu. ft. Ing. Rand, 2 stg. mtd. on 3 steel wheels.
5—160 cu. ft. 2 stg., Ing. Rand, LeRoi, Davey and Worthington, on pneus., and steel wheels.
6—105 cu. ft. 2 stg., C.P.T., Ing. Rand and Davey, mtd. on pneus. and steel wheels.

CRUSHERS

1—No. 4 Champion jaw crusher, size 9x15", Ser. No. 2606.
1—No. 2 Climax jaw crusher, size 9x16".
1—Buchanan jaw crusher, size 10x16".
1—Acme jaw crusher, Ser. No. 1873, size 12x20".
1—Acme jaw crusher, Ser. No. 1686, size 9x16".

CRUSHERS—Cont'd

1—United Iron Works, "Blake-type" jaw crusher, size 9½x24".
1—Allis Chalmers, No. 5 gyratory crusher, Ser. No. 5331, opening 10x38".
1—Austin No. 5 gyratory crusher, Ser. No. 2945, opening 12x35½".

DERRICKS

3—Steel Guy Derricks: 1—20-ton American-Terry, 90' mast, 110' boom; 1—5-ton Terry Guy Derrick, 70' mast, 60' boom; 1—5-ton Insley, 75' mast, 80' boom. Stiff leg derricks: 1—12-ton derrick, 75' boom for hook work; 1—2-ton Pittsburgh, 26' boom, 15' mast. Also a number of wood stiff leg derricks, 1 to 5-ton cap.

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55—Electric, ranging from 20 H.P. up to 125 H.P., consisting of triple-drum, double-drum and single-drum, with AC or DC motors, some with attached swingers. Following makes: American, Clyde, Lambert, Lidgerwood and National.
Gas hoists ranging from 8 to 120 H.P., single, double and triple-drums; all standard makes (38 in stock).
Steam, ranging from 8 H.P. to 60 H.P., single, double and triple-drums; all standard makes.

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2—**SCREW CONVEYORS**—12″ x 110′, no casing.
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13—Hammer Mills, Williams, Jeffrey, Gruendler
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1—10x12″ Fairbanks Morse horizontal water cooled air compressor.
1—No. 4—42″x12′ Rotary washer on steel frame, spur gear drive. Mfg. by Stocker Concrete Material Washer Co.
1—100 ton capacity 42′ Platform R. R. track scale, structural steel framing, wood beam housing. Mfg. by Straight Scale Co. 1—Straight Scale 14700-lb. Cap. with 72x60x3/16″ 2-Comp. hopper on I-Beam frame. 1—United Iron Wks. 6′x60′ 2 tire rotary clay dryer with trunions and gear drive and belt pulley.
1—57″x32′ 2 tie rotary clay dryer with trunions arranged for belt drive. Mfg. by American Process Co.

Your inspection and inquiries solicited.

BROWN-STRAUSS CORP., Kansas City, Mo.

Representative on Premises

QUALITY

OVERHAULED EQUIPMENT

All equipment listed is owned by us. All overhauling done in our modern daylite shop by experienced mechanics.

CRANES, SHOVELS, & ATTACH.

P & H 600, 1¼-yard, lifting capacity 19 tons ($4,000.00 spent in complete overhaul).
P & H 206, ¾- to 1-yard crane
MARION 1½-yard Diesel shovel, 1936 model, completely overhauled in our shop
SHOVEL ATTACHMENTS for 600 P & H, No. 4 and No. 105 Northwest, 301 Koehring

CRUSHING & WASHING PLANTS

ROCK CRUSHING PLANT, 15x38 roller bearing crusher, feeder 42x24″ roller bearing rolls, vibrating screen, bin; 2-unit outfit; with or without power; overhauled.
CEDARAPIDS single-unit, straight-line Model JT-400, 1938 model, 10x24″ roller bearing crusher, 16x16″ roll crusher 3x10′ Symons screen, on pneumatics. Waukesha power.
ALLIS-CHALMERS, 12x24, Improved Blake crusher.

LIME PULVERIZERS

10-LIPPMAN, 24x18, on steel wheels, with elevators.

POWER UNITS (Overhauled)

CLIMAX 60 h.p. 5½x7.
WAUKESHA 50 h.p. 5x7.
WAUKESHA 75 h.p. 6x6½.

BOEHCK EQUIP. CO.
2405 W. Clybourn MILWAUKEE 3, WISC.

PLANT EQUIPMENT
Rebuilt & Guaranteed

2—4′x6′ Tyler Hummer Vibrating Screens Complete — Generator

ENSLEY GUY DERRICK

80′ boom 3 Drum Hoist
90 HP Motor—1 Yd. Bucket

CUMMER ROTARY DRYER

56″x40′ Very Good Condition

WE BUILD IN OUR SHOP

Belt Conveyors
Bucket Elevators
Perfect Classifiers

WE REBUILD IN OUR SHOP

Pumps — Motors — Crushers

THE WILLIAM W. NEWELL COMPANY

P. O. Box 477 Nashville 2, Tenn.

IMMEDIATE DELIVERY
REBUILT
SPEED REDUCERS

ALL TYPES—SIZES UP TO 300 HP

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Over 500 units in stock, including such well known makes as Falk, Cleveland, James, Foote, Philadelphia, Jones, Palmer Bee, Link Belt, and others.

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Rebuilt REEVES DRIVES in stock

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All units are thoroughly overhauled and sold on money back guarantee.

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Our prices far below OPA ceiling value.

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PATRON TRANSMISSION CO.
154 Grand Street New York 13

WASH PLANT COMPLETE

Includes

1—D 17000 Caterpillar diesel direct connected generator.
1—10"x30" Good Roads Reduction crusher.
1—16"x16" Cedar Rapids roll crusher.
1—3'x6' 3-deck Niagara Screen.
2—4'6x26' sand drag wash boxes.
1—24" Good Roads feeder.
1—5"x4" Worthington D.C. water pump.
4—18" belt conveyors, roller bearing.
1—7'x7' steel hopper.
1—3'x5' single deck screen.
1—set stone bins.
1—20 ton Howe truck scale.
1—office and scale bldg.
all motors, drives, pipe, etc. for operating. Lease includes plenty of material. Delivery by truck, boat, and rail.

FRED H. ELDREDGE
RD No. 2 **Homer, New York**

FOR SALE

1—Browning Steam Locomotive Crane No. 8 50' Boom, 8 Wheel Standard Gauge Capacity 42, 200 lbs. at 15' Radius, Arch Bar Truck Construction—located our Yard, Baltimore, Maryland.

2—8" Jaeger Centrifugal Pumps, Equipped with 6 Cylinder Hercules Engine on 4 Steel Wheels with 4 15' Sections of 8" Hose (Suction) Coupled.

THE HENRY H. MEYER CO., INC.
110 South Howard Street
Baltimore, Maryland

Gyratory Crushers; Allis Chalmers, Kennedy, Telsmith, Austin and others.
Jaw Crushers; Buchanan 12x36, Type B, Good Roads 22x50" Plain bearings.
24" x 100' Belt Conveyor, 440 volt MD.
Bucket Loaders, Barber Greene, Haiss, Nelson.
¾ yd. P&H Dragline 40' boom, ¾ yd. Bkt.
Austin Back Filler, telescopic boom 20-35'.
3' x 52' Rotary Dryer, oil burner & Fan.
4'9" x 60' x 6' x 60' Dryers ½" plate.
4-8 Ton 24 x 36" Ga Gas Locomotives.
100 HP Fairbanks Morse Diesel Engine.
180 HP Fairbanks Morse VA Full Diesel.
125 HP Venn Severin Diesel, Factory Rebuilt.
46 HP GM & 60 HP Caterpillar Diesels.

What do you need? What have you for sale?

MID-CONTINENT EQUIPMENT COMPANY
Pa 2290 **710 Eastgate** **St. Louis 5, Mo.**

½ YARD CLAMSHELL BUCKET

½ yard Blaw Knox Dreadnaught light digging narrow type clamshell bucket, weight 2200 lbs., rebuilt and guaranteed. Immediate shipment. $475.00 F.O.B. New York City.

R. C. STANHOPE
60 East 42nd Street **New York City**

Allis-Chalmers 16" Superior-McCully gyratory crusher, rt. hd. drive, A-1. Also 2—No. 9 std. McCully 21"; and a 12" gyratory crusher.
Fruehauf 50-ton low bed carryall machinery trailer, 10'x26' deck, solid rubber tires, A-1.
Plymouth 25-ton gasoline locomotive, std. ga.-West.
Bucyrus 50B steam shovel front, 2-yd., A-1.
Worthington 5'x40' rotary dryer, direct, ½".
Boiler tubes, 236—1¾" x 5', copper ferrules, new.
Pioneer 300 W. portable gravel washing plant.
Merriman asphalt plant, r.r. type, 30-tons hr.
Newhouse 7" gyratory reduction crushers (2).
8—Locomotives, 30"-36" ga., 7 to 20 tons, gasoline and steam, rebuilt, guaranteed.
Euclid 6-yd. bottom dump crawler wagons (8)
Sturtevant rotary fine crusher, No. 2.
Toepfer revolving gravel screen, 48"x18'.

H. Y. Smith Company
828 Broadway **Milwaukee 2, Wis.**

FOR SALE

2 Rex No. 200 Double Pumpcretes with Waukesha six cylinder Gas Engines. Complete with Pugmill remixers, and 1200 ft. 8" pipe. Excellent condition.

12 Wagon Drill Type FM2, serial X71 W. D. drifters. Pneumatic tires. Excellent condition.

4 310 cu. ft. Portable I-R Compressors, Steel Wheels, Gasoline driven.

GREAT LAKES DREDGE AND DOCK COMPANY
122 South Michigan Ave.
Chicago 3, Illinois

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100 lb. Bradley Helve Hammer with 3 H.P. motor.
20" Upright Drill Press, No. 4 Morse Taper, with 2 H.P. motor.
20"x8' Ameridan Lathe, Q.C.G., Motorized.
Barber-Greene Bucket Loader, Buda Gas Engine, Disc Type.
Jaw Crusher, 8"x12" up to 8"x33".
CLAMSHELL BUCKETS, Erie's ¾ and 1 cubic yard, General Purpose—Owen's Type K, ¾, 1, 1¼, cubic yard—Blawknox's ⅝, ¾, ⅞, 1, 1¼ cubic yard, General Purpose—Brownhoist, 1 cubic yard, Material Rehandling. Owen Type S 2 cubic yard.
DRAGLINE BUCKETS, Page Class C, ¾, 1, 1¼, 2¼ cubic yard.
The above equipment is offered subject to prior disposition and is available immediately.

YATES
MACHINE WORKS
115 Main Street
Rochester, Michigan

COMPLETE PLANT

Producing highest quality moulding sand. Market available for entire output. Now in profitable operation. Being sold to settle Estate. Ohio location. Exceptional opportunity.

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PATTERSON EQUIPMENT CO.
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Phone—Cherry 0439

FOR SALE

One Model 70 Marion Railroad Type Caterpillar Mounted Steam Shovel, 3½ Yard Capacity in Very Good Condition.

5225 Eastern Avenue **OHIO GRAVEL COMPANY** **Cincinnati, Ohio**

COMPLETE STONE CRUSHING
or
SAND and GRAVEL PROCESSING SERVICES
available on tonnage basis

We will install NEW, MODERN portable or semi-portable plant in any practical location. Capacity 100 to 150 tons of stone per hour or 150 to 200 tons of sand and gravel per hour.

Estimates Furnished Without Obligation

CONTRACTORS SERVICE CORP. **Address** **Camp Hill (suburb of Harrisburg), Pa.**

CONTRACTOR'S EQUIPMENT
All in fine condition!

8, Allis Chalmers Speedace Tractor Wagons.
1, RD 7 Caterpillar Diesel Tractor with LeTourneau Bulldozer
1, RD 7 Caterpillar Diesel Tractor with ATHEY Bulldozer
1, Model 75 Caterpillar Diesel Tractor with push plate
1, Model 50 Caterpillar Diesel Tractor with LaPlant Choate Bulldozer
1, Model 70 Caterpillar Gas Tractor
1, Model 60 Caterpillar Gas Tractor with LeTourneau Bulldozer
2, Model "L-15" Gar Wood Scrapers
1, Model "J-12" LeTourneau Scraper
1, 48" Caterpillar Elevating Grader
5, Euclid Track Truck Hauling Units
4, Tournapulls

IRON & STEEL PRODUCTS, INC.
13490 S. Brainard Ave., Chicago 33, Illinois
"Anything containing IRON or STEEL"

Jaw Crushers—4"x8" up to 18"x36".
Crushing Rolls—16"x10" up to 54"x24".
Gyratory Crushers—No. 3, No. 12.
Ring Roll Mills—No. 0, No. 1, and No. 2.
Swing Hammer Mills.
Rotary Fine Crushers—Nos. 0, 1, 1½ and 2.
Direct Heat Rotary Dryers—3½'x25', 4'x30', 5½'x40', 6'x50', 7'x50'.
Semi-indirect heat Dryers—70"x35'.
Cement Kilns—3' up to 8' diameter.
Hardinge, Marcy & Fuller-Lehigh Mills.
Raymond Mills—Nos. 00, 0, 1, 2 Roll.
Tube—Rod and Ball Mills—3' to 6' diameter.
Vibrating Screens—Air Separators.
1—C. P. T. Cos, portable gasolene eng. driven, 210 cu. ft. compressor.
New Dryers built for all purposes.

W. P. HEINEKEN
277 Fulton St., N. Y. **Tel. Barclay 7-7298**

FOR SALE

2—22-ton Baldwin 4-Wheel Saddle Tank Locomotives 36" Gage
30—4 yd. Koppel Steel Dump Cars 36" Gage
Brownhoist Loco Crane 8 Wh. Std. Ga. 15-ton 40' Boom with 1½ yd. Clamshell Bucket
No. 2 Sturdevant Ring Roll Mills
5' x22' Tube Mill with Flint Lining
5' 6" x 20' Schmidt Tube Mill
625 KW 3Ph 60 Cy 440v Turbo Generator
750 KW 3Ph 60 Cy 440v Turbo Generator
above complete with all attachments
5—200 HP Wickes Vertical Boilers with Murphy Furnaces

• •

THE T. J. LANE COMPANY
Phone 2-3362 **Springfield, Ohio**

FOR SALE

NEW AND USED STEEL

Structural
Plates
Sheets

Storage Tanks

Rails — Cars — Locomotives

HYMAN-MICHAELS CO.
122 S. Michigan Avenue
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FOR SALE

Sauerman drag line scraper complete, including ⅓ yd. Crescent bucket, durolite blocks, 600 feet of cable, bridle anchors, guys and guy attachments, and 22 H.P. gasoline driven hoist. In perfect condition. Used only a few months. Will sell for $1500. f.o.b. Philadelphia — original cost $2270.

R. A. PETTENGILL
Box G **9 Sniffen Court**
New Hope, Pa. **or** **New York, N. Y.**

FOR
IMMEDIATE DELIVERY
OF
RUBBER PRODUCTS

Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.

CALL, WIRE or WRITE
CARLYLE
THE
RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

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PROTECT THAT PLANT
FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	Per Length
¾"	25 feet	$4.25
1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
All Prices—Net—F.O.B. New York

CARLYLE RUBBER CO., INC.
62-66 PARK PLACE NEW YORK, N. Y.

DREDGE FOR SALE — BINS FOR RENT

- 110 ton aggregate
- 300 bbl. cement
- Conveyors
- Air compressor

Both will be available after Sept. 15

J. B. & J. W. ROBERTS • BOX 34 • RICHMOND, VA.

SHOVELS—CRANES
Moore Speedcrane 15 tons, gas, 65' boom.
Lima Model 101 comb. Shovel-Crane. Excellent.
P & H Model 600 Shovel, 1 yard capacity
Bucyrus Erie Model 50B, 2 yd. comb. Shovel-Crane
Bucyrus Erie Model 1030 Electric Tunnel Shovel
Bucyrus Erie Model 37B, 1½ yd. Shovel, gas.
Osgood heavy duty gas Shovel, 1 yard
Marion Model 460 Electric Shovel, 1½ yard
Byers ½ revolving Crane, Shovel & Backhoe
Ind. Brownhoist 10 ton cap. Crane, gas, 40' bm.
Brownhoist 5-7½ ton Gas Crane, 30' boom
Koehring Shovel Front, ¾ yard
Osgood Shovel Front, 1 yard

SPECIALS!!
2—Steel Stiff-leg Derricks, 10 tons, 100' bm.
Allis-Chalmers cent. pump, electric, 3500 GPM. 50'
Worthington 8" cent. bronze impeller, elec. Pump
Butler 16 cu. ft. Asphalt Pug Mill

BUCKETS—STONE SKIPS
2 yd. Hayward Clamshell, rehandling
1½ yd. Williams Clamshell, rehandling
⅞ yd. Blaw-Knox Clamshell, digging
Hayward ¾ yd. Standard Orange Peel
⅝ yd. Williams Clamshell, digging
2—½ yard Haiss Clamshell, rehandling
¾ yd. Haiss Clamshell, rehandling
Erie ¾ yd. Clamshell, rehandling
Owen Stone Grapple

TRACTORS—BULLDOZERS
TD 40 Diesel Tractor with bulldozer
Allis Chalmers Model LO Tractor with bulldozer
Allis Chalmers K Tractor with Baker bulldozer
Allis Chalmers L Tractor with Baker bulldozer

CRUSHERS—CRUSHER PLANTS
Gyratory Crushers: K.V.S. 30, 37-S, 49; Traylor 8"; McCully 13", 8", 6"
Jaw: 10x22, 10x24, 11x18, 12x24", 14x24", 16x32, 56x84"
Complete Rock Crushing Sand & Gravel Plants

LOCOMOTIVES—CARS
American 60 ton, steam, std. ga.
American 50 ton, steam, Saddle Tank
American 45 ton, Saddle Tank
Porter 13 ton, Steam Saddle Tank, 36" gauge
Milwaukee 9 ton, std. gauge, gas
Vulcan 8 ton, std. gauge, gas
Vulcan 6 ton, 36" gauge, gas
20—Phoenix 5 yd. heavy duty, 36" ga. Quarry Dump Cars
21—Koppel 4 yd., 36" gauge Dump Cars
3—30 ton Standard Gauge Flat Cars, rebuilt

CONCRETE PLANT & EQUIPMENT
Heltzel 85 ton, 3 compt. Steel Bin, weigh batcher
Rex 28S Mixer on skids, almost new
Bulk Cement Bin, 350 bbls. Complete
Blaw-Knox 100 ton, 3 compt. Aggregate Bin
Heltzel 100 yds. 3 compt. Aggregate Bin
Butler complete Batching Plant 156 yds.

RICHARD P. WALSH COMPANY
30 Church St. New York, N. Y.

1 8" Link Belt Chain drive, 1" pitch, 36" centers. Pinion 17 teeth, bore 2⅞", Gear 46 Teeth, 2-7/16" bore. Price $50.00.

1 Allis Chalmers V-belt drive, 9 to 1 reduction 4' 6" centers, 4V belts, used with 30 H.P. motor. Price $50.00.

1 30 H.P. Fairbanks-Morse induction motor with controls A.C. 440 volts, 1800 RPM, No. 153482, frame 10D type HJ. Price $190.00.

1 440-volt, motor driven, DC Lincoln upright arc welder 200 amps. Price $150.00.

1 Jones Foundry & Machine Company worm gear speed reducer, housing No. 10, ratio 15½ to 1, order No. 30525, motor connection horizontal, other shaft vertical. Price $50.00.

1 Morris Machine Company 6" sand pump, belt driven, good condition. Price $150.00.

1 Cleveland slip ring 40 H.P. motor, 1800 RPM, frame 8 type MW serial No. C2949, with all controls. Price $300.00.

1 General Electric 75 H.P., slip ring motor, 1200 RPM, model No. 8936, type MT 343, Form B, No. 3746494, sleeve bearing. Price $500.00, with all controls.

1 6" Figure 6, No. 142395, centrifugal water pump, ball bearing, direct connected to 30 H.P. Fairbanks-Morse 1800 RPM motor, capacity 1000 gal. per minute, 60' head, Fairbanks-Morse make. Price $300.00.

1 Vulcan 7-ton locomotive, gasoline locomotive, standard gauge, fair condition. Price on request.

1 Knickerbocker soft stone eliminator. Fair condition. Price $600.00.

1 36" Symons Disc crusher. Fair condition. Price $500.00.

1 24" Symons Disc crusher. Fair condition. Price $500.00.
300' of belt, originally 30" conveyor. Will make fair 24" belt. Price 50c a foot.

Cass City Sand and Gravel Company
Cass City, Michigan

Crane 30 ton RR steam—Gantry 10 ton 100 ft. 3 motor DC.
Steel Cars 36" ga. 3 hoppers 25 ton—4 KPLE 4 yd.
Cableways—15 ton 1800 ft.—20 ton 1600 ft. tramway 20 ton.
Jaw crushers 84 x 56—25 x 42—30 x 36—double roll 54 x 24.
Dump wagons caterpillar 6 center dump 15 yd.
Shovels—(2) steam 50B—(2) Marion 125 electric.

A. V. KONSBERG, 8 S. Dearborn Street, Chicago

FOR SALE

18" x 36" Stevenson Single Roll Crusher.
9" x 36" Wheeling Jaw Crusher.
9" x 15" Phillips Jaw Crusher.
#4 Champion Jaw Crusher.
#1 Williams Hammermill Crusher.

PITTSBURGH MACHINERY & EQUIPMENT CO.
Aspinwall Pennsylvania

FOR SALE

One No. 4 Schulthess Hydrator
One No. 4 Kuntz Hydrator
One No. 1½ Sturtevant Rotary Fine Crusher
One No. 2 Kuntz Raw Lime Feeder
One No. 2 Clyde Feeder—Raw Lime or Stone

INQUIRE LIME & HYDRATE PLANTS CO. ASSOCIATES McGANN MANUFACTURING CO. YORK, PENNSYLVANIA

SKIP HOIST

36" dia. drum with 80 H. P. G. E. MTC motor, brake, & starter.

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13490 S. Brainard Ave., Chicago 33, Ill.
"Anything containing IRON or STEEL"

FOR SALE

Jeffrey 24 x 18 Type A Hammermill
K-B Hammermill 12 x 24
Diamond Triple Deck Vibrating Screen 3' x 10'

G. & W. H. Corson, Inc.
Plymouth Meeting, Pa.

FOR SALE

P. & H. Model 206 Crane-Dragline-Shovel combination. 35' boom, fairlead and ¾ yd. Page Dragline Bucket; shovel attachment with 20' boom, 15' stick and ¾ yd. dipper.

Grant Brick Works, Weldon, N. C.

FOR SALE

Motor Truck and Wagon Scales For Sale. One So-Weigh 15-ton 18 x 9 scale with grain beam. One Howe 6 ton 18 x 9 Wagon Scale with Grain beam.

Sherwood & Sons, Kahoka, Mo.

RAILS NEW AND RELAYING

MOST ALL SECTIONS IN STOCK also spikes, bolts, frogs, and switches available.
500 BRICK DRYER CARS
Always in the Market to buy surplus material. Send us your inventories.

M. K. FRANK
480 Lexington Ave. New York City
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Anchor Dble-bar Tamper Block Machine with power strike-off and Stripper, including 4, 8, 10" attachments, $750.00.
10" pallets 25c each.
8" pallets 15c each.

William Van Ess,
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PRICED FOR QUICK SALE

1—Allis-Chalmers Blake Type Jaw Crusher 10"x20" $800.00

LIPPMANN ENGINEERING WORKS
4603 West Mitchell St. Milwaukee, Wis.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C. for sale at attractive prices. New and Rebuilt. All fully Guaranteed. Send us your inquiries.

V. M. NUSSBAUM & CO., Fort Wayne, Ind.

15 ton, 22' x 9' Bonded Motor Truck Scale $440.00
20 ton, 24' x 9' Bonded Motor Truck Scale $525.00
3' x 6', 1 deck Bonded Vibrating Screen $495.00
3' x 6', 2 deck Bonded Vibrating Screen $595.00
3' x 8', 2 deck Bonded Vibrating Screen $685.00

All new—large stocks, many models, immediate delivery. Also some guaranteed used equipment without priority.

Bonded Scale Co., 110 Bellview, Columbus 7, Ohio
Scale, Vibrating Screen and Crusher Mfrs.

FOR SALE

(2) Worthington Portable Compressors, Model 160SS, serial Nos. 886520 and 887121; mounted on 4 steel wheels, with towing tongue; 160 c.f.m. Powered by Continental Red Seal gasoline motors, 5¼" bore x 6" stroke, 52 HP at 780 RPM. With air receivers, 20" dia. x 60" long.

BARON IRON & EQUIPMENT CO.
P. O. Box 601 Chattanooga 1, Tenn.

FOR SALE: Brooks Load Lugger with five—2½ yard buckets. 90% new.

Jersey Quarry Company
Jerseyville Illinois

FOR SALE: Pallets—4500—¼ x 2¼ x 18¼ flat steel, in good condition.
2—Clark—3 ton Low Lift Trucks TL580, TL581, first class condition.
Prices on application subject to prior sale.

CONCRETE STONE AND BLOCK CO.
14647 West Warren
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FOR SALE

1—SAND & GRAVEL DREDGE, steel construction, 14x40' pontoon, 25' rotary cutter, 70 HP Hercules Eng. 6" H&B pump, V belt driven, quick dump stone trap, 5 drum hoist, spuds, priming pump all complete. Bargain.
1—150 HP DOUBLE DRUM HOIST direct connected to two speed motor with all electrical controls. Used very little.

C. D. SMELSER CONST. CO.
511 W. Colfax Avenue South Bend, Indiana

EQUIPMENT FOR SALE

Lidgerwood Single Drum Hoist, 22 HP, 3 Ph., 60 Cy., 220/440 V AC motor. Practically new.

THE INDUSTRIAL EQUIPMENT CORPORATION
P. O. Box 1647 Pittsburgh, Pa.
Warehouse Carnegie, Pa.

WANTED

Kent Ring Roll Mills
No. 7 Preferred

SOUTHERN MACHINERY AND SUPPLY COMPANY
Roanoke, Virginia

WANTED

Engineering Draftsman experienced in stone crushing and screening and lime manufacturing. Reply giving age, experience, education, salary expected and references. Address

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WANTED — BARBER-GREENE 82-A model or HAISS Bucket Loader of similar type. Largest size with vibrating screen and high discharge. To be used in digging sand out of a bank.

URGENT! Can give AA-1 Priority.

Allegheny Sand and Loam Company
507 Oliver Building Pittsburgh, Penna.

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Attorney at Law

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CORE DRILLING ANYWHERE

We look into the earth

PENNSYLVANIA DRILLING COMPANY
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WANTED

One used 650 to 800 H.P. single drum electric hoist with motor.

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Give qualifications, including age, education, experience. Address:

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WANTED TO PURCHASE

Crushed Stone Plant or Equipment to process 100 to 500 tons per day.

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VICTOR OOLITIC STONE COMPANY
P. O. Box 65, Bloomington, Indiana

WANTED experienced concrete pipe, concrete block or special products man to take full charge of product department of national organization having twenty-five plants. Applicant should be familiar with practical side of pipe, block or special products manufacture.

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Overhead electric traveling crane, 7½ to 10 ton, 60' to 80' span, 4 motor, A. C.
Two 300' & 500' Air Compressors.
50 to 60 lbs. pr.
One 24" x 24" Jeffrey Coal Crusher.

W. P. HEINEKEN
227 Fulton Street
New York, New York

WANTED TO BUY

All Sizes of Tractors with Blades
2 yd. Diesel Shovels
2 yd. 50B Bucyrus Shovel
2 yd. Re-Handling Clamshell
Small Shovels & Backhoes
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BOX 1004, PIT AND QUARRY PUBLICATIONS

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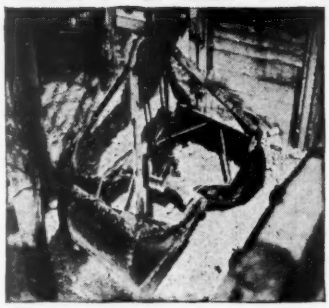

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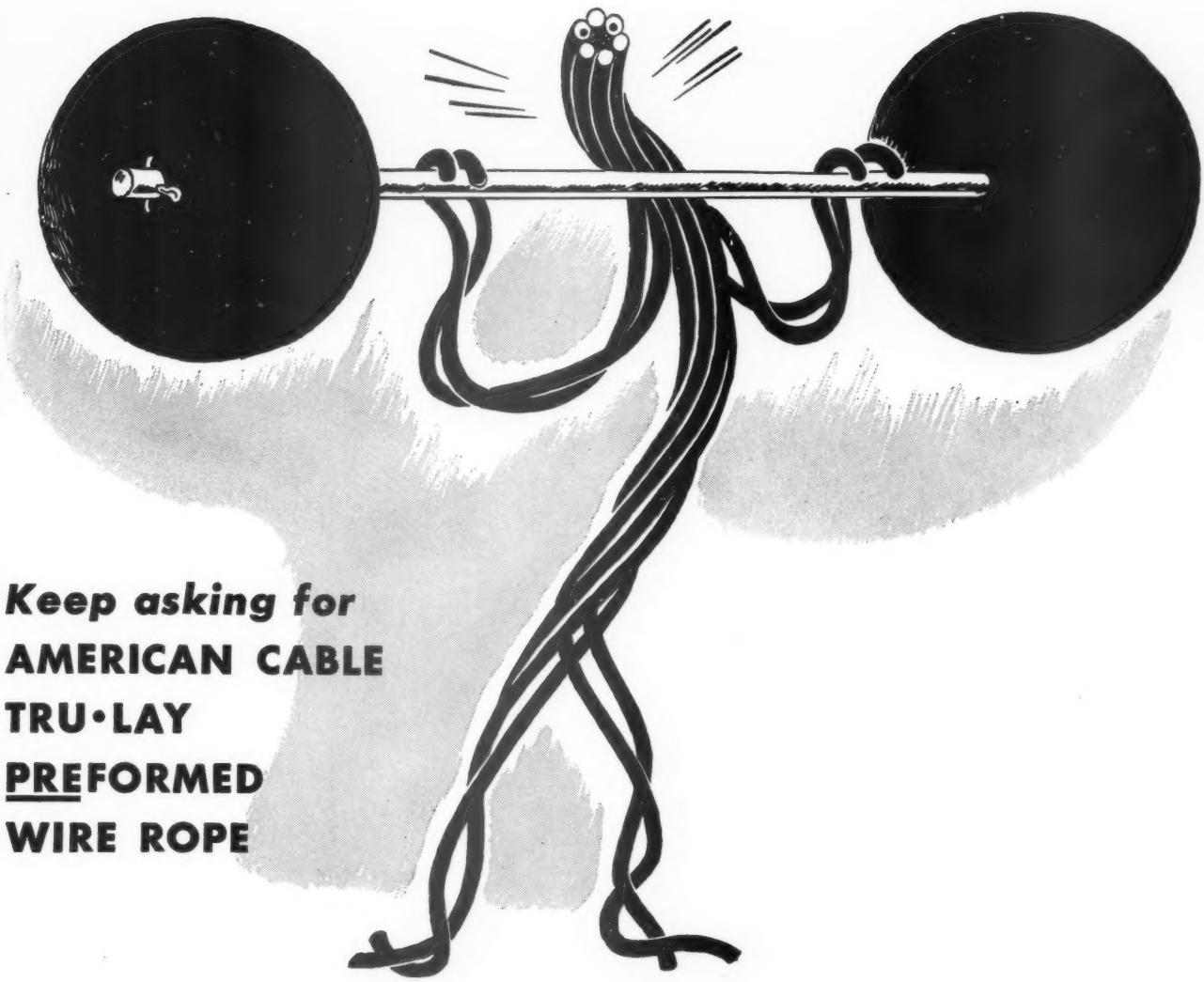

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